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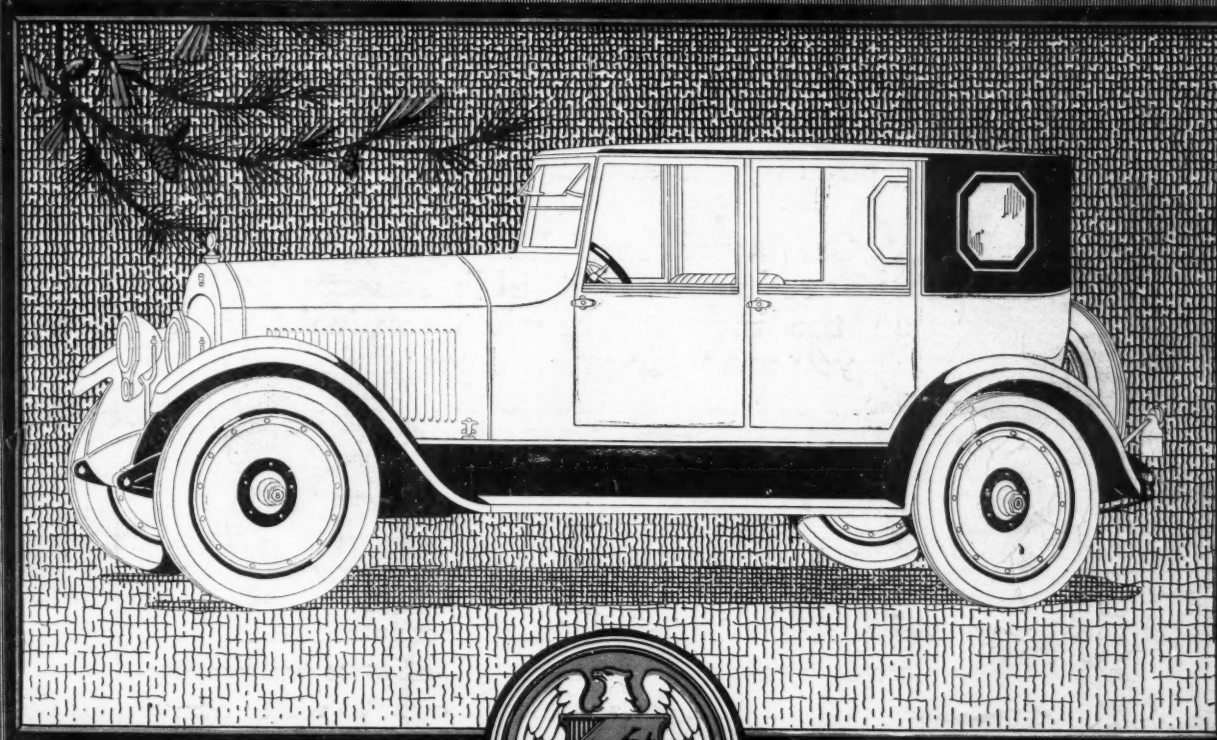
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MOTOR AGE

Volume XXXVII
Number 8

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, FEBRUARY 19, 1920

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MOTOR AGE

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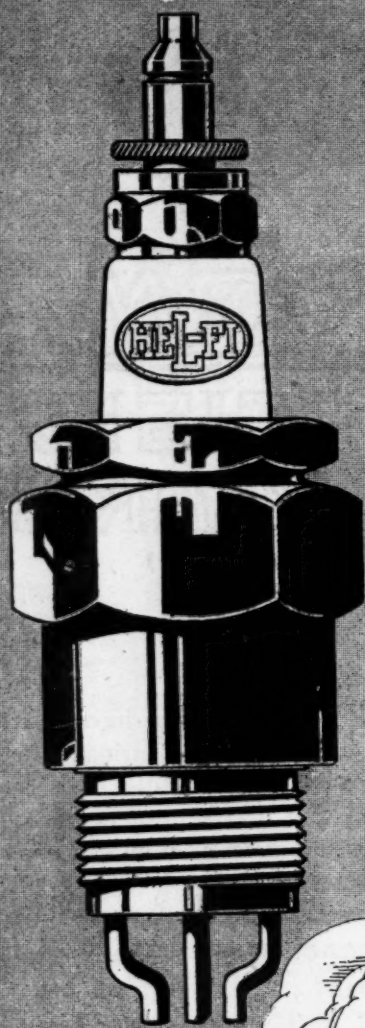
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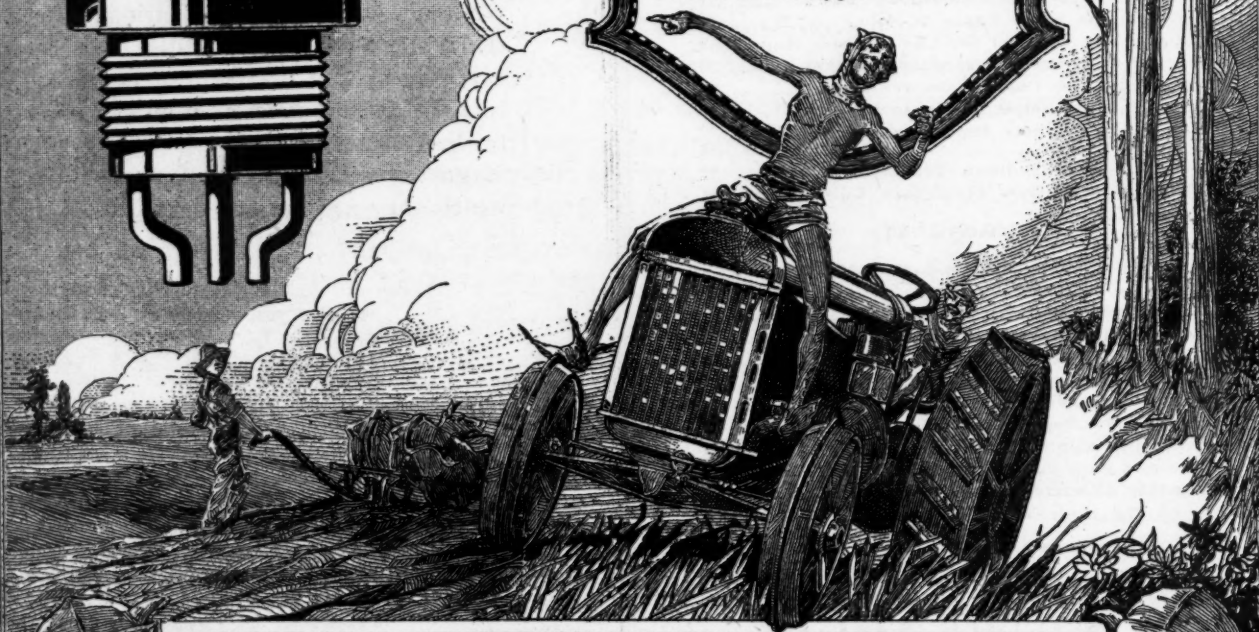
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“THERE IS A
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FOR EVERY MOTOR”

THE HEL-FI COMPANY, BELVIDERE, ILLINOIS, U.S.A.

MOTOR AGE

COMPLAINTS

Must We Have Them?



OES service work on cars and trucks, or tractors mean that we must have a certain number of dissatisfied customers? In other words, complaints?

It seems to many dealers that maintaining the automotive products they sell is more or less of a thankless job. It certainly was such in the days when so-called free service was all the go and dealers did not know just when to charge and when not to charge.

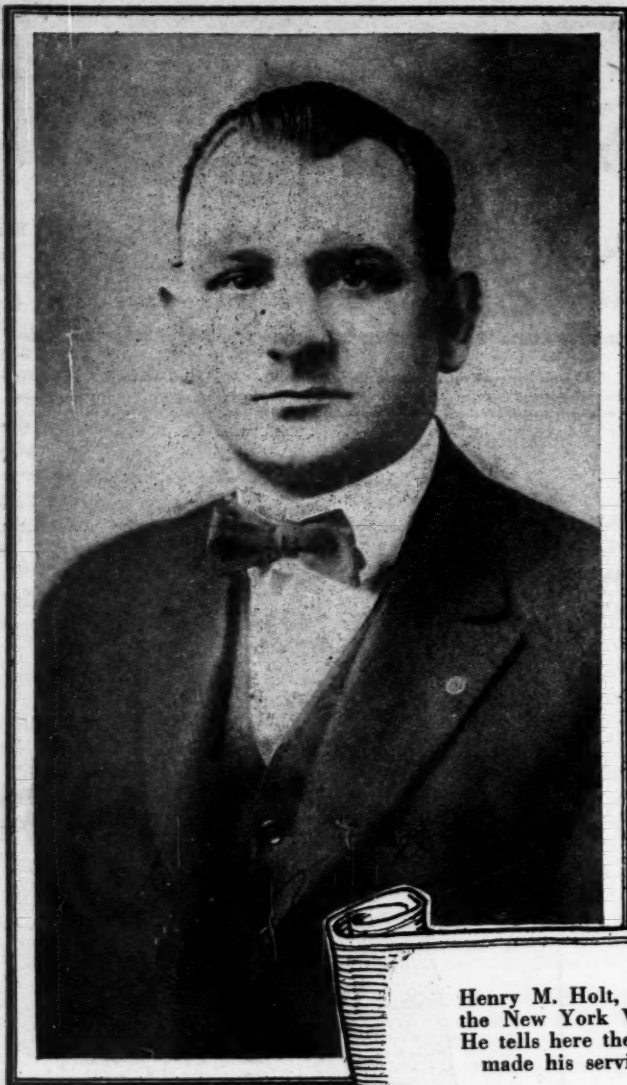
Complaints mean that somebody has played the wrong card somewhere. Still they are almost unknown to some dealers. There are other and probably always will be dealers who seem to get more than their share of complaints. Like everything else, there generally is a good reason when a customer becomes all heated up, either about his bill, the work done or something else.

Complaints may be due to holding up a job too long. Or, to putting poor men on the job and charging for first class help. Wrong diagnosis of trouble, gruff treatment of customers, old time methods in the shop, guess-work about costs and taking a chance that the customer will foot the bill, etc., are some reasons for complaints.

Complaints can be eliminated and are being eliminated. They are unnecessary. When it is possible to do hundreds of repair or service jobs without a single complaint, it stands to reason the management and the house policy must be right. The story on the next pages shows how the service manager of the New York Branch of the Willys-Overland Company has succeeded in weeding out the complaint bugbear. Many of the ideas set forth can be applied to any dealer's business, big or little.



2622 Jobs



Henry M. Holt, service manager of the New York Willys-Overland Co. He tells here the methods that have made his service so satisfactory

Editor's Note: Every month, the Automotive Service Association of New York holds a meeting addressed by some man who has made a conspicuous success in some branch of service. One of these talks was by Henry M. Holt, service manager of the New York branch of the Willys-Overland Co. His success is attributed to his keen foresight in preventing trouble and to the proper distribution of the work through the shop. His statements mark a step in advance in service. Holt's record of 2622 jobs without a single complaint, he attributes largely to the fact that he uses the flat rate system in charging, thereby settling definitely with the customer before the job is ever taken into the service station.

ALTHOUGH the routing of a repair job does not actually start until the repair order has been written and signed, I am firmly convinced that the owner, especially if he is a new one, is under the impression that the routing of his own particular job starts or should start immediately after his car has entered the service station, and if it is his first visit he still holds before him the rose colored picture painted by the salesman, and firmly impressed upon his mind are the assuring words that "should he at any time find it necessary to seek the assistance of the service station their intelligent willingness and their most undivided attention, coupled with all the modern facilities to give him paramount service shall always be at his disposal."

The customer remembers this, and, what more, he expects its fulfillment. It therefore becomes the duty of the service department to do everything within its power to make these, his expectations, come true. Some customers are hard to please, others impossible, but it should never be said that a dissatisfied customer was the result of the inability of the service department to do its best.

Let us assume that the customer has

just bought a car and that he finds, or believes that he has found, something the matter with it which he thinks ought to be attended to. He very likely will go to the sales department first, asking for the salesman who sold him the car, who will naturally in turn refer him to the service station. Then, having left the salesroom with its beautiful marble floors, its plants, its soft cushion settees, he arrives at the service station and finds that everything is different. At the door he is met by the door-man, to whom a customer means nothing but additional muscular effort to open the door so that his car may be let in.

In Two Parts—Part I

In this story Mr. Holt tells the requirements of a good service organization, wherein a service job is handled from the time the owner drives in, trouble diagnosed, repair contract made and the car is ready for the shop.

Part II

NEXT WEEK—From the time the car is sent to the shop, is finally tested and ready for the owner will be told

Next Week

There is an old saying that a gentleman is a man who is clean both inside and outside. This can be most fittingly applied to a service station. It should be, in regard to cleanliness, in such condition that any customer, lady or gentleman, may visit it without giving the serv-manager cause for being ashamed of himself or his organization.

The next important step is the manner in which the customer is received. Nothing is more aggravating than to have the car owner find that he has to wait and waste valuable time until some employe, either through a mistake or an accident, finds that the customer is on the premises. Beside, the customer may open his eyes and look around, and if he is a keen observer he may see and hear things that would not confirm with that which the salesman once told him about the service station. The keynote of all employes on the service floor should be—"prompt and courteous attention."

In a large service station a special man should be detailed to receive customers. Great care should be taken not to select one for this position whose qualities would be better fitted for that of a professional mourner or an official bouncer, for it can be readily seen that unless this employee is pleasant, tactful, has a thorough knowledge of the car, and is capable of giving the customer the desired information intelligently, his services may be detrimental instead of beneficial. It would also be advisable to give this man full charge of the testers in order that there may be no confusion or argument as to whose turn it is to give the customer further assistance and attention to his needs.

Testers sometimes have a highly de-

Without a Complaint

How the Service Manager of One of the Largest Service Stations Routes Through Jobs So Successfully That He Has Not Gone Wrong on a Single Job

veloped sense of justice, especially when it comes to giving preference to the customer who is most generous with his tips. This is not fair to the employe, as there may be a possible chance that his hands, from the continued habit of reaching out for tips, may acquire an unnatural attitude that would mar him for life. The evil of tipping should be abolished.

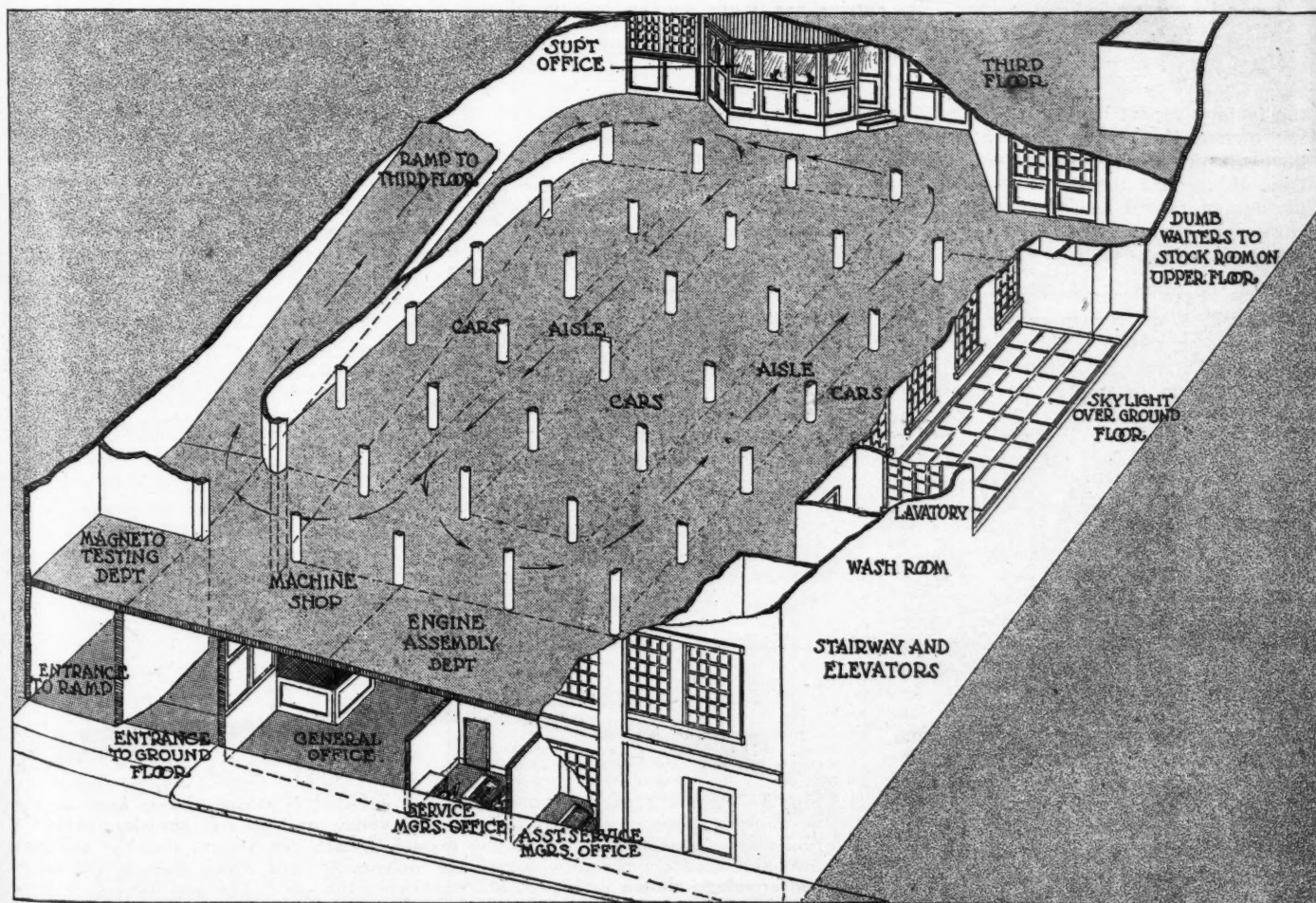
In a smaller establishment where the service manager acts in several capacities, it is of course understood that he should be in possession of all such qualifications that would make his services an asset to himself and the organization that employs him, and I person-

ally believe it would be well for every service manager to take upon himself the duty of meeting as many customers as possible, as often, information of great importance would come to his notice that otherwise would escape his attention. I cannot urge too strongly the importance of having every service manager instruct each employe who comes in contact with a customer as to his duties and the value of giving the customer prompt and courteous attention, and also make the employe fully realize that through his action he holds in his hands the reputation of his company.

After the customer has stated his wants a tester should be assigned to diagnose the troubles in question. There are several reasons why this should be done. Firstly, the customer's idea of what is wrong with his car may not confirm with that of the tester. Secondly, it is extremely valuable for the service department to have a record of the running condition of the car at each visit in order that there may be no dispute later. Also, the tester may find something which ought to be done which would be detrimental to the running of the car if the repairs were delayed. To simply write an order in accordance with the customer's explanation is a bad practice and should be discouraged. It is not always necessary to test a car on the road.

A good tester can, if building conditions allow, correctly diagnose a great many troubles just by driving the car around the floor. Where space is limited a different procedure is advisable. After

Dividing the Shop Into Departments Has Helped to Eliminate Complaints



This is a cut-away view of the New York branch of the Willys-Overland Co. Holt has found that the most practical plan is to divide the shop into departments, such as engine, rear end, electrical, body, miscellaneous, etc.

Fig. 1.—At left is preliminary tester's report printed on white paper. This is pasted at the top to the heavy manila form shown in Fig. 2. A carbon paper reproduces the top part of what is written on Fig. 1 on the top part of Fig. 2

written down whenever it is possible.

The efforts of some of our best testers to write an order intelligently is often deplorable. How many of us have seen an order—"take knock out of engine and fill it with fresh oil," or "locate short-circuit and tape it up." Such orders are not only without sense, but they are misleading and criminal, and often result in unnecessary expenditure on the part of the customer, not to mention the large portion of grief for the service manager. The cure for such an evil is the adoption of standard expressions; that is, each working operation is written so it means the same to the customer, order taker, estimator, shop foreman and his mechanics. It has been found of great value to have in book form a list of standard expressions so they could be learned and memorized by all concerned. Should a tester or order taker, after such procedure has been adopted, still insist upon writing—"the car is loose all over, tighten same in general" and expect the shop foreman or his mechanics to unravel such puzzle.

On the order should also be stated what the customer is to pay for and what he is not, and if there are any items for which the charge cannot be determined until certain parts have been disassembled, it should be marked—"subject to inspection or report." Have it thoroughly understood with the customer what you are to do for him and there will be little cause for dissatisfaction when he comes to take delivery of his car. My advice to the service de-

Fig. 2—Any additional entries are made at the bottom of the card by the tester. The lower coupon forms the claim check and is given to the customer

the tester's report has been presented to the owner, the owner may or may not have all the work done, as he sees fit. One thing has been accomplished—a permanent record has been made of the car's condition on that date.

Intelligent Order Writing

It is the practice of some automobile companies to have a tester give a complete report as to the car's condition. After this is done the customer is turned over to the service salesman, who in turn explains the necessity of having the work done; in short, sells the customer. The disadvantage in connection with such an arrangement is that it takes a great deal of time and, as it frequently happens, the customer's time is a great deal more valuable than that of the order salesman.

A different method, which has been applied by some of the largest service stations in the country and has been used by the writer with success, is that of combining the duties of the tester and the order taker into one; that is, the tester also becomes the order salesman. This employee, who preferably should be a graduate from the shop, should diagnose the trouble, write the order and sell the customer on the idea that he will be benefited by having such repairs done to his car. In writing the order care should be taken to get the customer's correct initials and name, also the address and telephone number should be

Fig. 4

Fig. 3

Fig. 3—Repair order and invoice. The original is white and is kept in the accounting department. The duplicate is yellow and goes to the shop information clerk. Additional carbons are furnished each department that the car goes into and a cardboard copy forms the instruction card which goes in the celloid envelope shown in Fig. 5, accompanying the car. The stub of Fig. 6 goes with the yellow copy

Fig. 4—This is the reverse of the white sheet or original shown in Fig. 3. The carbons are blank on the back

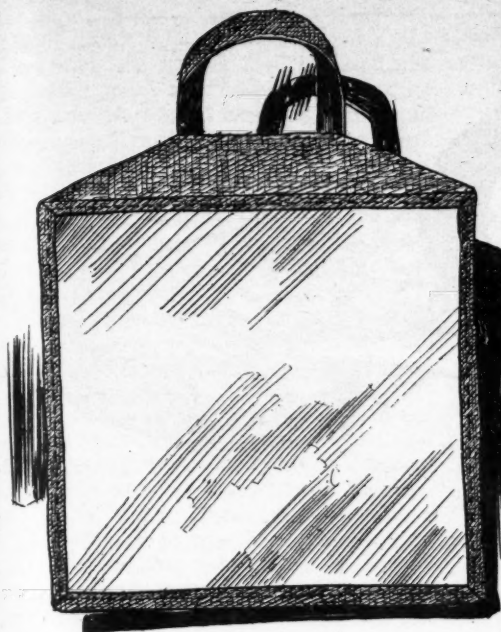


Fig. 5—This is the celluloid envelope which holds the shop instruction card

partment is to spend time and thought in writing the order intelligently, for upon that rests the success of the department.

Invariably after the order is written the customer will ask how much it will cost. You cannot blame him for asking that, especially in these times when labor and material costs may change over night. Few of us would think of ordering a suit without first inquiring as to the price, so do not think the customer is a crank because he wants to find out the size of the bill with which he later will be presented. Unfortunately very few service managers agree as to what is the most satisfactory method of charging a customer. To those who still adhere exclusively to the old practice of charging for all work on time and material basis, I can only say that they are confessing a weakness and lack of initiative, both in personal efficiency and in service management.

Flat-Rate System

The only exception in this case would be such work as cannot be done within the service station, but which has to be sent out. This has to be charged on a time and material basis, unless an estimate can be obtained by the person who is doing the outside work. What would the customer think after having asked for the price if he was told that it would all depend upon how the man felt who was going to do the job? If the man goes early to bed the night before and if the baby don't keep him awake, he can do the work as quickly as anybody, but if the landlord fails to heat the apartment to 68 deg., thereby causing him to catch a cold, the job will take much longer. It sounds ridiculous, doesn't it? Well, it's just as ridiculous for an up-to-date service station, be it large or small, to sell all repair work on a time and material basis.

NAME

R. A. MODEL DATE

NAME

R. A. MODEL DATE

Motor Dept. ☐ Paint Dept. ☐
 Wre. Dept. ☐ Body Dept. ☐
 Rear End Dept. ☐ Trim Dept. ☐
 Blacksmith Dept. ☐ Tinsmith Dept. ☐
 Elect. Dept. ☐ Battery Dept. ☐

Put a mark in after those departments which are to work on car. When completed, mark ✓

WILLYS-OVERLAND, INC.
NEW YORK, N. Y.

Fig. 6—Routing card. The order clerk marks each department which is to work on the car, tears off the check at the top and turns it over to the information clerk who hangs it on the routing board shown in Fig. 7. The other half is attached to the white copy of the repair order. The order clerk then turns forms shown in Figs. 1 and 2 over to the estimator

A little better than the method just mentioned is the maximum and minimum system. Here it seems that someone has actually started to do some constructive thinking in the right direction, but why anyone should give up the good work when so near the goal is hard

to understand, for surely it should not take a great deal more thought for anyone who is able to give the maximum and minimum figure to find a point between the two that can be used as a basis for an estimate, or flat-rate system. The estimate, or flat-rate system, as adopted by many service stations all over the country, has one big advantage—that it enables the customer and service department to come to a definite understanding as to the price of the job before the actual work has begun. That alone is a big step towards satisfaction.

Two Forms of Flat-Rate System

There are two forms of the flat-rate system. One giving a flat rate for labor, plus the price of material and the present war tax. The other gives a flat rate for both labor and material. To state definitely which is the better of the two would be folly, as it depends largely upon local conditions and the nature of the job, but the writer has found from personal experience that the best result has been obtained by a combination of the two. In order to make a flat-rate system workable the prices and various operations should be kept in card form, indexed either alphabetically or according to the different units on the card. The practice of having different men estimate work for different departments, such as one man for mechanical work, another for body work, has the one disadvantage of taking up too much time. The writer has tried both and found that the time expended in making an estimate could be cut in half if one man submits prices on all operations called for on the order, no matter if it is mechanical work or coach work. The overlapping of operations is very impor-

(Continued on page 36)

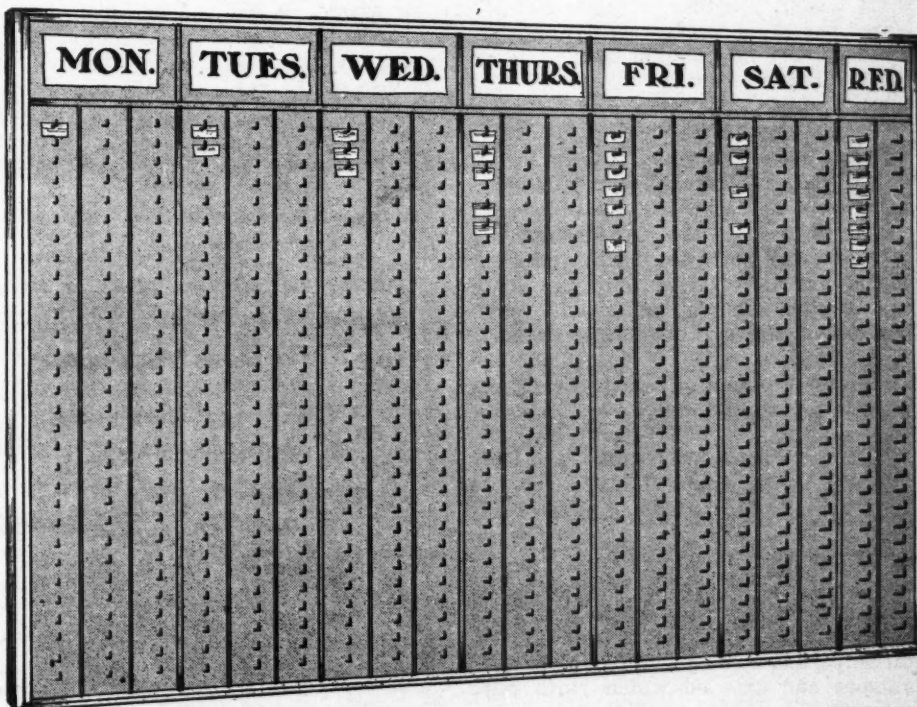


Fig. 7—The routing board which has a number of hooks to hang the routing cards on. It is divided into days of the week so that the clerk will know when his board is clean



To Expect Good Factory Service You Must MEET THE FACTORY HALF WAY

By M. B. DAVEY

(Service Manager, Milburn Wagon Co., Toledo, O.)

ONE often hears the expression "rotten service" when it is not rotten service at all but the result of a misunderstanding. For example, an owner calls up the dealer and asks for a front fender. The dealer immediately wires the factory to ship a front fender. The information is not sufficient. The service department does not know what fender is required. If it should be a left hand front or a right hand front fender. Neither is the model of the car given. It becomes necessary for an exchange of telegrams or letters to get the necessary information so that the proper part can be supplied. In the meantime the owner is out the use of the car. Result, owner says "your service is rotten."

The dealers service department can save time and money in securing parts from the factory by familiarizing themselves with the manufacturers' parts catalogue, as this is usually very comprehensive and gives in detail the part and number.

In ordering parts the name and number of article, together with the quantity wanted should be given. Serial number of the car should be given in every instance.

If in doubt about any part, accompany your order with a rough sketch of the article wanted. Do not make your description too brief, if anything, give more details than necessary. This will enable the factory to fill the order intelligently.

When it is necessary to return parts to the factory, the same attention to details should be used as in ordering parts. Notices should be sent the factory service department advising the quantity returned; Part number and name; Invoice number and date on which parts were shipped and reason for return.

Parts returned for credit or replacement on account of defects should have the following information.

Owner's name: Car number from which part was removed; date of removal; reason for such removal.

In making credit claims for parts the above information should become part of the claim and in addition the part should be tagged with the claim number. Claim should cover one car or parts from one car only. If claim covers two cars or parts from two cars, separate claims should be made for each. This will assist in making office records and facilitate the handling of claims. Correspondence pertaining to claims should always refer to claim number, as correspondence pertaining to cars is usually filed under car numbers and enables the factory to locate the required information promptly.

Dealers' service department can be of very great service to factory service department by giving attention to the conditions under which failure occurred.

Inspection of the part should be made before it is removed and afterwards.

See if it functioned properly or if the failure was due to the improper working of the part working in conjunction with it.

Inspection should be made with the idea of extra stress or overloading; with reference to failure due to an accident; then with regard to defect in material or workmanship.

Remember that no automobile manufacturer is infallible and errors are liable to occur despite the best engineering efforts and those of the factory inspection department.

The information acquired from the dealer's service department will assist the factory service department in reaching a decision and also result in the betterment of the product.

All factories welcome just criticism. Dealers should be careful and not take a single failure too seriously, as often

Some of the Things You Should Do When Order- ing Parts from the Factory

Always give full shipping instructions

Do not make your description too brief

Give more details than necessary

Do not leave anything to the imagination of the parts department

times it is an inherent defect in the material and not in the design. Failures may occur once and never again. Often parts are re-designed on complaints from dealers and then find these complaints have been made too hastily. In making these changes the factory finds itself in a serious predicament owing to the fact that they encounter difficulties in re-designing which will not allow the new part to function as well as the old.

Co-operation between the dealer's service department and factory service department can but result in mutual good to both.

Our company has under consideration at the present time the issue of a bulletin book covering the method of adjustment, clearances and the approximate time required to perform certain operations. This will also outline any special tools or equipment required. It is the belief that this will insure more uniform repair methods among our dealers and result in a saving of time to the dealer's service department and enable them to return the car more promptly to the owner. The result is that the customer has been given prompt and efficient service at a minimum cost.

Salesman Propaganda

The most important thing to accomplish from a service point of view is for the dealer to place his service department on an efficient basis. Equip it with proper stock of parts, sufficient floor space and tools and last but not most important a capable force of mechanics to take care of the number of cars in his territory.

It is most important that the owner be educated in the care of his car and his responsibility for same. The salesman should be made largely responsible for this education as he is the first to come in personal contact with the owner.

The owner should be informed that the size of his repair bills is largely in his own hands and by careful observations of certain principles his repair

Observe These Rules When Returning Parts for Credit

Owner's name

Car number from which part
was removed

Date of removal

Reason for such removal

This should include a short history of
the vehicle, telling the use to
which it has been put

bills can be kept at a minimum. He should be instructed as to just what he is to receive in the way of service.

Service does not consist of getting something for nothing but does consist of prompt and efficient attention at a minimum cost. Most owners are willing to pay for real service.

After the salesman has given the owner his first schooling in the care of his car, etc., he should be brought in contact with the dealer's service manager, so that the two can become acquainted and for further instructions if necessary. This also gives the owner the opportunity of knowing to whom he should apply in case he requires assistance of any nature.

A monthly inspection system should be established at an agreed price per month which will insure a fair profit to the dealer's service department.

The car should be gone over, wheels lined, bolts and nuts tightened and minor adjustments made. This monthly inspection will bring to the owner's attention the condition of his equipment and the responsibility for same. A copy

of the inspection report should be mailed to the owner and not sent out with the car. This must be done to insure the report getting to the proper party.

Most concerns publish from time to time pamphlets giving full instructions for the care and operation of their vehicle. The dealer should pay particular attention to see that the owners are supplied with this literature.

In connection with what has gone before it might be said that, especially in the case of farmers expecting service on their trucks or tractors that to a great extent they can be their own service men. This is so because farmers as a general thing are more familiar with tools and machinery and have their own shops for doing repair work. The city man is not so well versed in the handling of tools and machinery neither has he on hand a big layout of tools, so must of necessity call on the dealer service organizations to a large extent. Regarding broken parts on tractors, here too, the farmer very often can help matters along by forging out a new piece or mending the old one, which might hold at least until new parts can be had from the dealer in the city.

Jobs for the Specialist

Of course, certain jobs had better be done by a specialist, as for example, installing a new crankshaft in a tractor engine, timing the engine or bearing work and as working on the magneto. This is about all the farmer would hesitate about in doing his own service work. Also, aside from putting an operator's instruction book in the user's hand, many little things about the tractor should be pointed out, telling what to do and what to avoid. No maker's instruction book, whether for motor car, truck or tractor is so complete that the customer will know everything he should know.

Finally the most important thing is SERVICE. Service makes satisfied customers and satisfied customers are the best advertisements.

Conclusions From the Story That Will Help the Parts Situation

As a general thing dealers and repairmen must familiarize themselves much more with the parts catalogs the manufacturers send out. These catalogs are not meant to be filed away on a shelf. Frequent reference to them will save much money and speed up service.

When you order parts don't take anything for granted. Your order is but one of several hundred the factory might receive in a day. So tell everything necessary, the man filling the order at the factory then will not be in doubt as to how many or what parts you want.

Be just as careful in sending details when parts are returned for credit.

A claim should cover one part or parts from one car only. If the claim covers two cars or parts from two cars separate claims should be made out for each. This will facilitate office records and handling the claims.

Two Ideas That Help Your Service

IN submitting this price-list we can assure our patrons that any tire offered for repair will be thoroughly examined before any work is done on it and repairs and retreading will only be done on tires that give every indication of sufficient mileage to warrant such repairs. No definite mileage can be guaranteed on repair work but we do guarantee the workmanship and material used to be the best procurable.

No. _____ STALL _____

DR TO **SERVICE GARAGE**
DELLA BRADLEY HEFTON, PROP.
C. E. PITTERS, MGR.
STORAGE REPAIRS VULCANIZING
GRAND AVE. AT FOURTH
LOS ANGELES, CAL. PHONE 66344

STORAGE FROM _____ TO _____

TERMS
Not responsible

NO. 1—It is human nature not to welcome bills, unless, of course, they are marked paid. But did you ever think of sending your customers bills in the form shown to the left, as is done by the Service Garage. Instead of handing his customers a barren looking sheet with items checked off, like most bills look, this enterprising dealer prints a little message of good will on the back of the folded card, on the front of which is the customer's name and amount due. The inside of the folder which is about 4 by 4 in. when opened, contains a list of tire repair operations and prices. The chances are the car owner will stick the folder in the door-pocket of his car for future reference and the dealer whose name is on the card gets the future jobs.

TIRE REPAIR PRICE LIST

FABRIC TIRE RETREADING				Cord Tire Retreading	
Size	Full Retread	Non-Skid and Ribbed Retread	Recap	Ribbed Tread	
28x3	\$6.00	\$	\$5.00		
30x3	6.50	9.00	5.50		
30x3 1/2	8.25	10.25	7.25	14.00	
31x3 1/2	8.50	10.50	7.50		
32x3 1/2	8.75	10.75	7.75	15.00	
34x3 1/2	9.00	11.25	8.25		
31x4	10.00	14.00	8.75	17.00	
32x4	10.50	14.50	9.25	17.50	
33x4	11.00	15.00	9.50	18.00	
34x4	11.50	15.50	10.00	18.50	
35x4	11.75	16.00	10.25		
36x4	12.00	16.50	10.50	19.00	
32x4 1/2	13.75	17.00	12.00	19.50	
33x4 1/2	14.25	17.50	12.50	20.00	
34x4 1/2	14.75	18.00	12.75	20.50	
35x4 1/2	15.50	18.50	13.00	21.00	
36x4 1/2	16.00	18.75	13.25	21.50	
37x4 1/2	16.50	19.00	13.75	22.00	
33x5	16.50	19.25	14.00	23.00	
35x5	17.50	20.50	14.50	24.00	
36x5	18.25	20.75	14.75	25.00	
37x5	18.75	21.25	15.50	25.50	
38x5 1/2	20.00	25.50	18.75	30.00	

10% discount on two or more jobs at one time

SECTION REPAIRS

Size of Casing	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"
Price each section	\$3.75	\$4.50	\$5.50	\$6.50	\$7.75	\$10.00
Not to exceed	7"	8"	10"	11"	12"	13"
Each add. inch	.35	.40	.50	.60	.75	1.00
Each add. inch	.25	.30	.35	.40	.50	.75
Surface patches or Reinforcements	1.50	1.50	1.75	1.75	2.00	2.75
Cementing Liners furnished by us	2.50	2.75	3.25	3.50	3.75	5.50
Where several patches come within one cure, allowance is made accordingly. Above are minimum prices for surface patches and reinforcements.	5.00	5.50	6.00	6.50	7.00	7.50

INNER TUBE REPAIRS

Mounting	
Punctures	\$.25
Tire change	.25

BLOWOUTS

Length	2"	4"	6"	8"	10"
Price	\$.50	\$.65	\$.75	\$1.00	\$1.25
Length	12"	14"	16"	18"	20"
Price	1.50	1.75	2.00	2.25	2.50

VALVE REPAIRS

New Metal Valve		Large	Small
New Valve Base		\$.75	\$.65
		.60	.50

SECTIONAL SPLICES

Size of Tube	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"
Price each splice	\$1.00	\$1.25	\$1.50	\$2.00	\$2.25	\$2.75
Not to exceed	10"	12"	14"	15"	16"	18"
Each add. inch	.10	.10	.10	.15	.15	.20
Single splices vulcanized						each \$.75

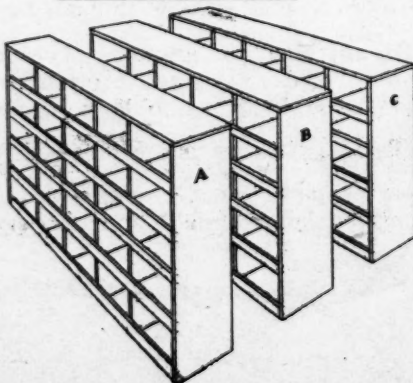
Prices subject to change without notice

Here Is Another Good Service Hint

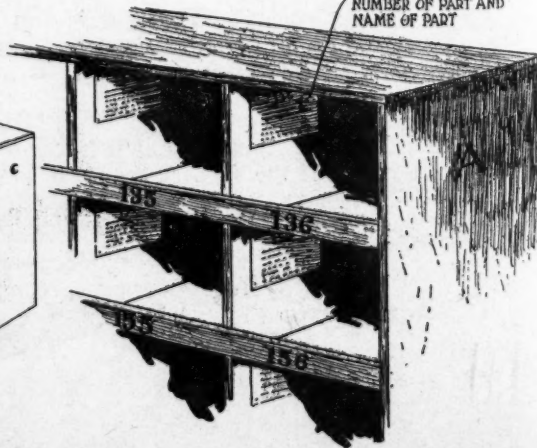
NO. 2—This is an idea that easily can be adopted by any car, truck or tractor dealer for the parts department. The proposition is simply this: A paste-board card about 2 by 3 in., which has marked on it the bin number, name of part and models it fits, is tacked to the inside of the bin for reference. Being tacked on the inside it cannot be torn off easily. By putting down on the card the numbers of the models the parts contained in that bin fit, the keeper of the stock department immediately can tell if a customer can be fixed up knowing what model he has.

NO 136
NAME *Spring handle Bolt*
USED ON MODELS *H32-K42*

CARD



CARD GIVING FACTORY NUMBER OF PART AND NAME OF PART



A Little History

In 1911 there were only two or three automobile concerns in Davenport that are still in business today. One of these is the Interstate Auto and Supply Company. Since that time many other companies have been organized. How many remain? How many are more than two years old—five or seven years? To a keen buyer there is only one place to go for passenger cars, trucks their equipment and maintenance.



SECOND DOOR WEST OF POSTOFFICE
DAVENPORT, IOWA

(1181)

A Matter of Service

Automobile service does not mean something for nothing but the rendering of quick and efficient relief at a reasonable cost. It has ever been an Interstate policy to save you money by employing the best mechanics, using the best materials and giving first consideration to quality. Your car interests are thus carefully safeguarded.



'IT PAYS TO PLEASE'

SECOND DOOR WEST OF POSTOFFICE
DAVENPORT, IOWA

(1184)

Six Money Making Cards

Nobody is going to know how good your service is unless you talk about it and customers will put a lot more faith in your establishment if they have some sort of idea as to what your business policies are.

Here are six cards sent out by the Interstate Auto & Supply Co., Davenport, Iowa, which certainly ought to offer suggestions to other dealers for ways and means to advertise their service work. The same things can be said about trucks or tractors and it simply means a job for the dealer to apply the cards to whatever line he sells and services. The more original the ideas the better the results. Read these cards over and see how cleverly they have been worded.

The Square Deal

It is a fundamental Interstate policy that you should be pleased with your purchase. Accurate cost records are kept, to enable us to do your work at as low cost as possible and still maintain quality. It is our desire to give you the same consideration we would expect were we the buyer and you the seller.

Your Future Business

No lasting business has ever been built which did not plan for the future. The Interstate intends that each and every customer shall always receive full value whether the purchase be a car, truck, tires, accessories or service. We are ever looking for new methods and equipment to improve our Service to you that we may merit your future business.



'IT PAYS TO PLEASE'

SECOND DOOR

Call the Doctor

The physician or surgeon will neither guarantee his diagnosis nor a cure. He renders the best possible service based upon his study, experience and judgement. The Interstate applies the same principle to the automobile business. You receive the benefit of our experience and judgement, but we are not more able to guarantee a cure or assume responsibility than a doctor. The quack will agree to do anything to get the dollar. At the Interstate you will find Automobile Doctors—not quacks.



'IT PAYS TO PLEASE'

SECOND DOOR WEST OF POSTOFFICE
DAVENPORT, IOWA

(1182)

Labor Policies

A firm's employees represent the company. The Interstate is ever on the alert to learn of ambitious and capable men who can fit into the Interstate organization. Any employee who proves himself up to Interstate standards may become a stockholder in the company and share directly in the company's earnings. Such policies certainly protect the car owner. THINK IT OVER!



'IT PAYS TO PLEASE'

SECOND DOOR WEST OF POSTOFFICE
DAVENPORT, IOWA

(1185)

You Won't Waste Time and Get Your Feet Crossed If You Have A JOB FOR EVERY MAN

How the Locomobile Company of America in Philadelphia Has Organized Its Business so That Each Department Stays on Its Own Side of the Fence

IN the business of the Locomobile Co. of America in its Philadelphia territory every man has his duties so sharply defined that he cannot "cross in" on anybody else unless he does it purposely. In other words, there are specific boundaries, or lines of demarcation for departments. This plan saves money and customers and prevents friction.

One reason for careful departmentization is that the Philadelphia territory is an extensive one—it takes in Baltimore and Washington, each city branch having a resident manager responsible to the Philadelphia manager.

The manager of the Philadelphia office and territory approves all no charge work in the service department and all allowances made to customers in the three branches. He has under his supervision the sales department, service department with its superintendent, accounting department with its cashier and the Baltimore and the Washington branches.

The Service Department

The service department is highly organized. It is in charge of the superintendent, who has his own stenographer. The superintendent receives and investigates all requests for allowances and no charge work. He also approves all charges and allowances made to customers and all work done on a no charge basis, before it is submitted to the manager.

The superintendent makes all estimates to customers for repair work and acts as a salesman in the department, although he does no outside soliciting. The major portion of his sales is consummated through his coming in contact with customers and their chauffeurs while performing his duties as superintendent, suggesting needs and desirable articles as he talks with them.

Under the superintendent in the service department come the following divisions:

While this story deals with a large concern, there are, nevertheless, in it some ideas that can be applied to a smaller business. Very often the dealer must be the service manager, stockroom clerk and half dozen men at the same time, but by properly analyzing his business, his territory and building for a larger number of sales, he might see his way clear to departmentize his layout somewhat after the plans herewith shown, although on a smaller scale.

The shop, with these subdivisions:

- a—Foreman, directly in charge of shop and all mechanics.
- b—Time clerk.
- c—Shop stockroom clerk.
- d—Mechanics. Nineteen are listed.

The Garage, with these subdivisions:
a—Foreman. He is in charge of the garage and the inspectors. Under his direction all orders for repair work are taken and shop orders are issued. Under his direction, too, all finished repair work is inspected and cars are delivered to customers.

New Car Demonstrators—Two are listed.

Used Car and Truck Demonstrators. Inspectors—Three are listed.

Telephone Operator for Department.

Plant Employees—These include:

- a—Elevator operator.
- b—At least two washers.
- c—Three porters.
- d—Watchman.

The clerk and stenographer to the superintendent has an especially responsible job for this title. He acts as clerk to the service sales division and in addition inspects and attends to the delivery of all cars sold. He also records and arranges with the sales department all demonstrations and supervises them, sometimes demonstrating cars.

Taking the sales department as a separate unit in the system, considering for the moment only Philadelphia, the manager, at least for the time being, is sales manager of the passenger car department. This is a matter of expediency at this particular time. The manager has his sales manager of the truck department, where Riker trucks are handled.

It is the intention of the Philadelphia office materially to increase the sales force, especially in the truck department, as soon as possible. Passenger and truck divisions have separate sales force and stenographer.

Besides the passenger and truck divisions, under the head of sales department come the exchange car division, with its individual manager and stenographer, and the clerk and stenographer for the general sales department. The force for selling new cars is separate from the exchange car division.

The Accounting Department

The cashier is the head of the accounting department. He is cashier, not only for the local office, but also for the entire Philadelphia territory, including the Baltimore and Washington branches, and, in addition, the Atlanta, Ga., branch. The cashier's duties are obvious.

Formerly the cashier also had charge of the Philadelphia stockroom—a rather unusual arrangement—but more recently the two duties have been divorced. Now the superintendent is in charge of the stockroom and this plan is working out to better advantage, as the superintendent naturally is better informed regarding parts to be purchased.

The bookkeeper acts as assistant to the cashier in the accounting department and keeps the books for the four branches mentioned. The stock clerk is in charge of the stock division under the superintendent. He orders all parts and other merchandise to be issued on requi-

sition under the superintendent's direction.

In addition to the bookkeeper in this department, the cashier also has charge of the following: Biller, ledger clerk, and special stenographer and clerk for the department.

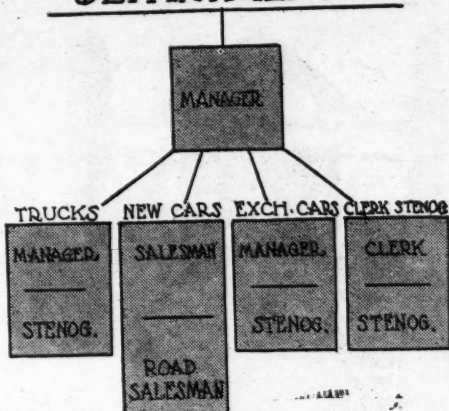
Other subdivisions of the stockroom force, in addition to the general clerk, are: One price clerk, two floor clerks and a shipping clerk.

The Baltimore Branch

The manager approves all charges and allowances made to customers and all no charge work before it is passed upon by the manager of the Philadelphia territory.

Under him is a shop and service fore-

PHILADELPHIA SALES DEPARTMENT



man who, in turn, has charge of the following divisions:

Shop—With four mechanics and an inspector.

Stockroom.

Sales department.

Demonstration section.

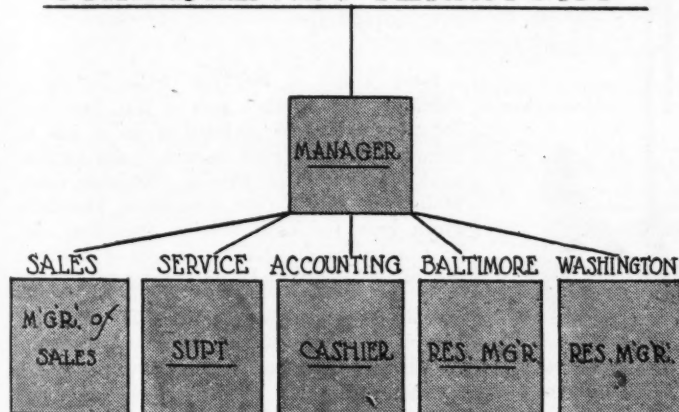
Garage and plant.

The shop and service foreman acts as inspector.

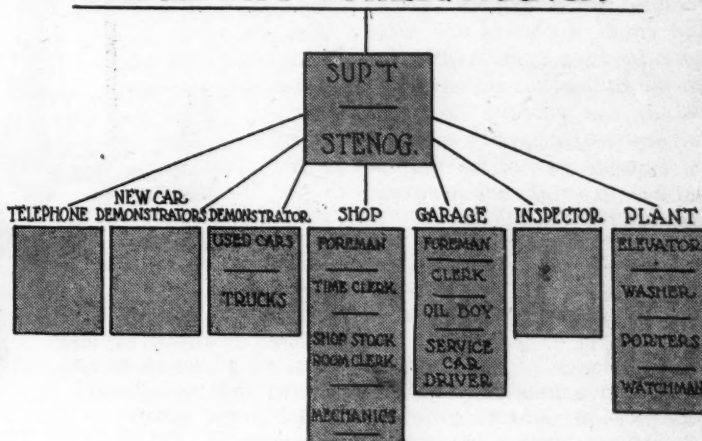
The Washington Branch

The Washington branch manager has general supervision of the branch, including shop and plant, and he also acts as a salesman. He approves all charges for work, etc., before they are passed on by the manager of the Philadelphia territory.

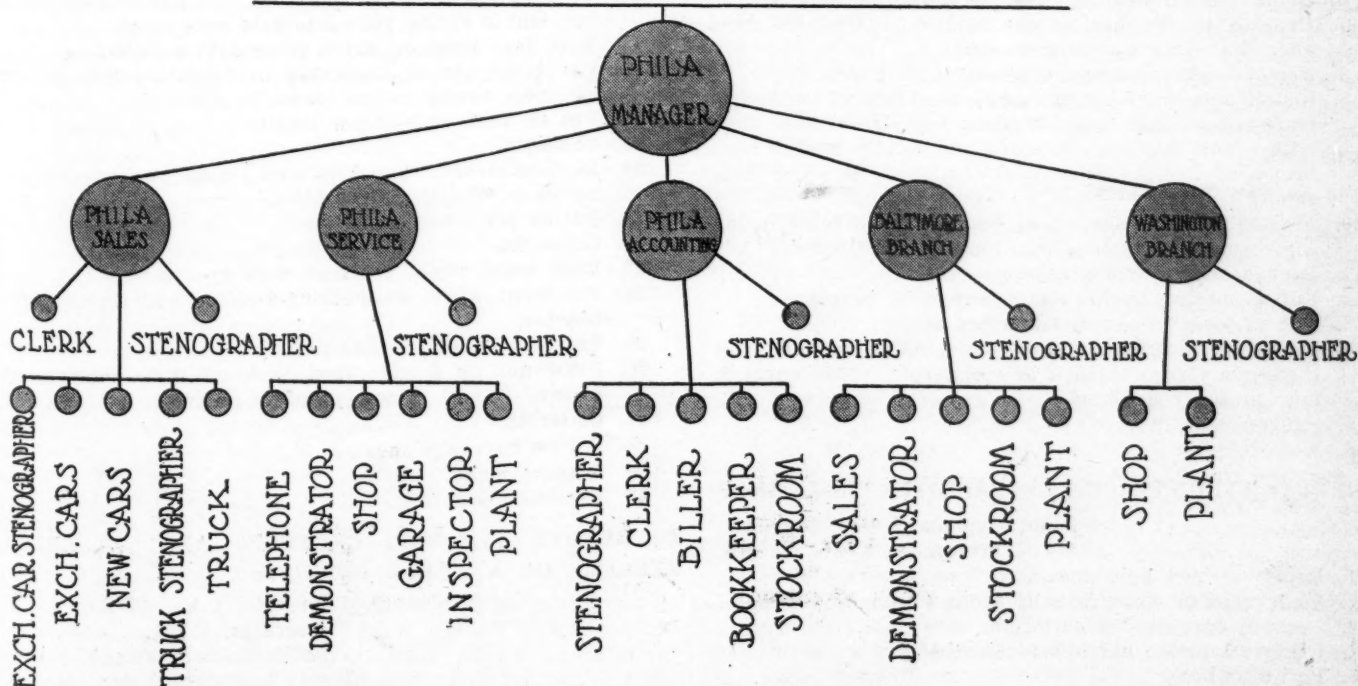
PHILADELPHIA TERRITORY



SERVICE DEPT. LOCOMOBILE CO. of AMERICA—PHILA. BRANCH



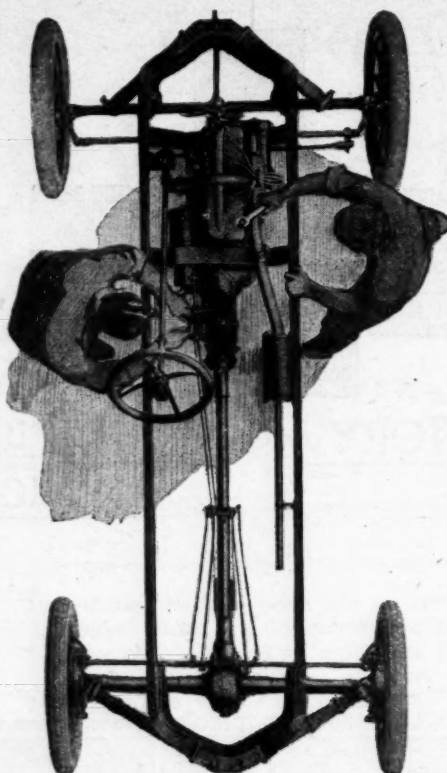
SUMMARY—PHILA. TERRITORY



These organization charts show the plan of operation of the Philadelphia branch of the Locomobile Company of America. For example the manager of the sales department is in charge of four departments, each of which is under the management of another person, as shown. These department managers, in turn, have under their care other persons, like salesmen, stenographers, etc. The lower chart shows the divisions under the Philadelphia manager

SERVICING THE OVERLAND FOUR

HEREWITH begins a series of articles dealing with the service operations on the Overland Four. The work as it stands has been prepared by the Willys-Overland Co., and the dealer will find at the head of each operation the amount of time required to do the job. The operations have been put down in a step-by-step method so that one operation is logically followed by the next. This makes it possible for the service man to have on hand all the necessary tools and equipment before beginning the job. Incidentally the time limit set for the job affords a ready means whereby the skill of the mechanic can be judged. Other things being equal it should not take a man longer to do a certain job than herewith mentioned, as the service department of the factory has established these limits after much experimenting. Dealers who are not keeping copies of MOTOR AGE on file are suggested to do so to get the benefit of this series.



THESE valuable articles—Servicing the Overland Four—will run serially each week until the service operations on the entire car have been explained. This week deals with the

Frame

Front Axle

Steering Gear

Springs

Next week will begin with the service operations on the

Engine

Keep a file of MOTOR AGE for ready reference. In another part of this issue the flat-rate system of estimating on a job is given as the best plan to make your service work pay you high profits, eliminate complaints and satisfy your customers. The time given here for each service operation can be adapted to the flat-rate system of estimating cost of repair jobs on cars of this class.

TO REMOVE AND REPLACE FRONT WHEEL BEARINGS

Time: 1 wheel, 15 min.
2 wheels, 30 min.

1. Remove hub cap—use hub cap wrench.
2. Jack up wheel—with jack under front axle.
3. Remove cotterpin from knuckle nut.
4. Remove steering knuckle nut and washer.
5. Remove wheel.
6. Remove inner bearing, using screwdriver as pry.
7. Remove inner bearing cap and dust washers from wheel hub—use soft drift punch.
8. Remove outer bearing cup—use drift-punch.
9. Install new inner bearing cup—use block of hardwood, until bearing cup is driven flush with wheel hub; then with a soft drift-punch, drive cup solidly against seat in wheel hub. Put in dust washers. Bearing cups should be started evenly in wheel hub.
10. Assemble new inner wheel bearing on knuckle, using a piece of steel tubing, 9 in. long for drift-punch.
11. Pack bearings with grease.
12. Put wheel on knuckle and insert outer bearing.
13. Put on lock washer and knuckle nut.
14. Tighten nut firmly with wrench; then back off nut three-quarters of a turn and cotterpin. The wheel is now properly adjusted.
15. Put on hub cap.
16. Remove jack.

TO REMOVE AND REPLACE OR STRAIGHTEN FRONT AXLE

Time: Replace, 2 hrs., 30 min.
Straighten, 3 hrs., 30 min.

1. Remove wheel hub caps.
2. With crane or chain falls lift front wheels off ground.
3. Remove knuckle nut cotterpin.
4. Remove knuckle nut and lockwasher.
5. Pull off wheel.
6. Remove pivot bolt nut cotterpin.
7. Remove pivot bolt nut.
8. Unscrew pivot bolt.
9. Remove steering knuckle. Repeat operations on other wheel and knuckle.

10. Remove cotterpin from spring yoke nut.
11. Remove spring yoke nut.
12. With a short pinch-bar inserted in axle yoke, as shown in Fig. 1, cock axle enough to allow front spring radius leaves to be pried from spring yoke with screwdriver.
13. With lead hammer, drive front axle from spring yokes. If axle is to be straightened, heat to a cherry red and straighten—let cool gradually.
14. To install front axle—jack axle into position, inserting bolt end of spring yoke into axle yoke holes.
15. With lead hammer, drive yokes into position.
16. Use pinch-bar as suggested in operation No. 12 and assemble spring radius leaves to yoke.
17. Put on yoke nuts—draw tightly.
18. Cotterpin.
19. Replace steering knuckles with thrust washer at top.
20. Screw in steering pivot bolts.
21. Put on pivot bolt nuts.
22. Cotterpin.
23. Pack front wheel bearings with grease.
24. Put front wheel on steering-knuckle and insert outer bearing.
25. Put on lock washer and nut.
26. Draw nut up firmly; then back off three-quarters of a turn. Wheel is now properly adjusted.
27. Cotterpin.
28. Put on hub caps.
29. Remove jacks.
30. Remove chain falls.

TO REMOVE AND REPLACE FRONT AXLE STEERING KNUCKLE OR KNUCKLE BUSHING.

Time: 1 knuckle, 1 hr., 30 min.
2 knuckles, 3 hrs.
1 set knuckle bushings, 2 hrs.
2 sets knuckle bushings, 4 hrs.

1. Remove wheel hub cap—use hub or cap wrench.
2. Jack up wheel with jack under front axle.
3. Remove cotterpin from knuckle nut.
4. Remove knuckle nut and lock washer.
5. Remove wheel from knuckle.

6. Remove inner bearing from knuckle, using screwdriver as a prying tool.
7. Remove cotterpin from knuckle arm.
8. Remove arm nut.
9. With lead hammer for driving and a heavy hammer for bucking against spindle, drive out knuckle arm, as shown in Fig. 2.
10. Remove pivot bolt nut cotterpin.
11. Remove pivot bolt nut.
12. Unscrew pivot bolt.
13. Remove steering knuckle.
14. See that steering knuckle pivot bolt fits properly in knuckle bushings. Cover bushing surfaces with cup grease.
15. Install new steering knuckle.
16. Install steering knuckle thrust washers at top of knuckle.
17. Screw in steering knuckle pivot bolt.
18. Put on pivot bolt nut and cotter.
19. Assemble steering arm to steering knuckle.
20. Put on steering arm nut, drawing tight.
21. Cotterpin.
22. Assemble inner wheel bearing cage on spindle, using piece of steel tubing 9 in. long as a drift-punch.
23. Pack bearings with grease.
24. Assemble wheel on knuckle and insert wheel outer bearing.
25. Put on lock washer and knuckle nut.
26. Tighten nut firmly with wrench; then back off nut three-quarters of a turn and cotterpin. The wheel is now properly adjusted.
27. Put on hub cap. When installing knuckle bushings, use sequence of operations as outlined above, including the 13th operation, then:
 1. With drift punch, drive out old bushings.
 2. Install new bushings, using hardwood block for drift.
 3. Ream bushings with S. D. 604, $\frac{1}{8}$ -in. expansion reamer.
 Begin with 15th operation and continue assembly as outlined above.

TO REMOVE AND REPLACE OR STRAIGHTEN STEERING KNUCKLE TIE ROD

Time: 15 min.

1. Turn wheels to extreme right or left.
2. Remove cotterpin from tie rod yoke end bolt nut.
3. Remove nut.
4. Unscrew bolt. Same operation on other end of rod.
5. Remove cotterpin from steering knuckle tie rod ball nut.
6. Remove nut.
7. Push out ball.
8. Remove tie rod.
9. See that tie rod yoke bolts fit thread in yokes.
10. Install tie rod.
11. Screw in yoke end bolts.
12. Put on nuts.
13. Cotterpin.
14. Insert steering tie rod ball.
15. Put on nut.

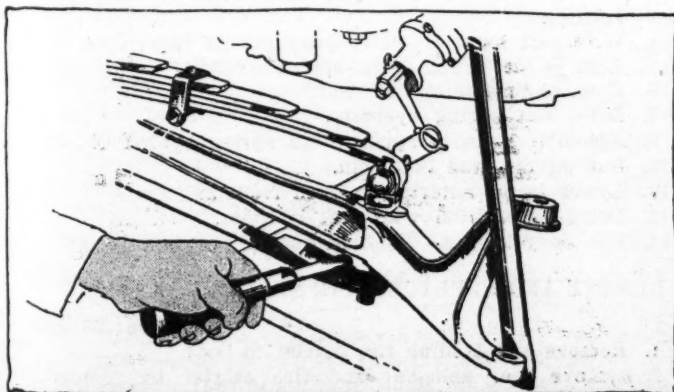


Fig. 1. Showing pinch bar inserted in axle yoke

16. Cotterpin. If steering knuckle tie rod is bent, allow 30 min. extra.
17. Line up front wheels.

TO REMOVE AND REPLACE STEERING KNUCKLE ARM

Time: 5 min.

1. Remove cotterpin from steering tie rod yoke end bolt nut.
2. Remove tie rod bolt nut.
3. Unscrew tie rod bolt.
4. Remove cotterpin from steering knuckle arm nut.
5. Remove steering knuckle arm nut.
6. With soft hammer, drive out steering knuckle arm. See Fig. 2.
7. Connect steering knuckle arm to tie rod with yoke bolt.
8. Screw in steering tie rod yoke bolt.
9. Put on steering knuckle arm nut. Tighten securely and cotterpin.
10. Put on nut and cotterpin.

TO REMOVE AND REPLACE STEERING KNUCKLE PIVOT BOLT

Time: 20 min.

1. Jack up front axle.
2. Remove cotterpin from pivot bolt nut.
3. Remove pivot bolt nut and screw out pivot bolt. Make sure that the oil hole in new bolt is thoroughly clean. Remove oiler from old pivot and bolt and place on new bolt.
4. Screw in new bolt.
5. Replace nut.
6. Cotterpin.
7. Remove jack.

TO REMOVE AND REPLACE STEERING ARM

Time: 15 min.

1. Remove cotterpin from steering connecting rod ball joint at steering arm end.
2. Remove spring retainer, using large screwdriver.
3. Remove spring and plug and disconnect steering connecting rod from steering arm.
4. Remove cotterpin from steering arm nut.
5. Remove $\frac{1}{2}$ in. nut.
6. Remove steering arm.
7. Put steering gear arm on steering-gear shaft.
8. Put on $\frac{1}{2}$ -in. nut and set tightly. Cotterpin.
9. Assemble steering connecting rod on steering arm ball.
10. Insert ball plug and spring.
11. Screw in spring retainer with heavy screwdriver and cotterpin.

TO REMOVE AND REPLACE STEERING GEAR

Time: 45 min.

1. Remove hood.
2. Remove cotterpin from steering connecting rod connecting at steering arm end.
3. Remove spring retainer, using large screwdriver.
4. Remove spring and plug. Then disconnect steering connecting rod from steering gear arm.
5. Disconnect horn wire.
6. Disconnect steering column from steering gear housing by removing two $\frac{1}{8}$ -in. nuts, lock washers and bolts from steering column coupling.
7. Drive coupling up and remove Woodruff key, pulling steering column up out of way.
8. Shut off gasoline supply line at tank.
9. Disconnect gasoline line.
10. Remove three $\frac{3}{8}$ -in. cap screws from steering gear bracket and remove steering gear.
11. Place steering gear housing in position and fasten with three $\frac{3}{8}$ -in. cap screws to steering gear bracket.
12. Put Woodruff key on steering pinion shaft and assemble steering column and coupling in position, locking with two $\frac{1}{8}$ -in. clamp bolts, lock washers and nuts.
13. Connect gasoline line at gasoline tank and turn on gasoline.

14. Connect horn wire.
15. Connect steering connecting rod to steering arm ball.
16. Put steering ball plug in spring and adjust by screwing in plug.
17. Cotterpin.
18. Replace hood.

TO REMOVE AND REPLACE STEERING ARM SHAFT, STEERING ARM SHAFT PINION, STEERING ARM SHAFT PINION PINS, STEERING GEAR INTERNAL GEAR AND STEERING PINION SHAFT.

Time: Replacing steering gear units, 1 hr., 30 min.
Replacing bushings, 2 hrs.

1. Remove hood.
2. Remove cotterpin from steering connecting rod connection at steering arm end.
3. Remove spring retainer, using large screwdriver.
4. Remove spring and plug. Then disconnect steering connecting rod from steering gear arm.
5. Disconnect horn wire.
6. Disconnect steering column from steering gear housing by removing two $\frac{1}{2}$ -in. nuts, lock washers and bolts from steering column coupling.
7. Drive coupling up and remove Woodruff key, pulling steering column up out of way.
8. Shut off gasoline supply line at tank.
9. Disconnect gasoline line.
10. Remove three $\frac{3}{8}$ -in. cap screws from steering gear bracket and remove steering gear.
11. Place steering gear unit in vise and remove four steering gear case cover bolts, lock washers and nuts. If pinion is broken, reassemble new pinion on pinion pin.
If steering gear internal gear is damaged, replace.
If driving pinion is damaged, remove from steering gear case cover and install new pinion shaft.
If steering arm shaft is broken, remove cotterpin and nut from steering arm shaft and remove steering arm.
Remove steering arm shaft.
Install new steering arm shaft.
Install pinions.
Install steering gear internal gear.
Install steering pinion shaft.
Put on steering gearcase cover.
To replace steering gear bushings, use the disassembling operations and remove bushing from steering gearcase and bushing from steering gearcase cover.
Install new bushings, making sure that the steering arm shaft fits freely in the steering gearcase bushing and that the steering pinion shaft fits freely in the steering gearcase cover bushing.
It may be necessary to use reamers to effect a proper fitting.
12. Put in steering gearcase cover bolts, lock washers and nuts. Tighten securely.
13. Assemble steering arm and steering arm shaft.
14. Put on $\frac{1}{2}$ -in. nut. Tighten securely and cotterpin. Make sure that the steering gear assembly is thoroughly lubricated and is working freely before installation of this unit in the frame.
15. Place steering gear housing in position and fasten with three $\frac{3}{8}$ -in. cap screws to steering gear bracket.
16. Put Woodruff key on steering pinion shaft and assemble steering column and coupling in position, locking with two $\frac{1}{2}$ -in. clamp bolts, lock washers and nuts.
17. Connect gasoline line at gasoline tank and turn on gasoline.
18. Connect horn wire.
19. Connect steering connecting rod to steering arm ball.
20. Put steering ball plug and spring and adjust by screwing in plug. Then cotterpin.
21. Replace hood.

TO REMOVE AND REPLACE FRONT SPRING OR SPRING LEAVES

Time: 1 spring, 45 min.; 2 springs, 1 hr.

1. Remove front splashers by removing one $\frac{1}{2}$ -in., two $\frac{3}{8}$ -in. cap screws, and two $\frac{1}{4}$ -in. stove bolts.
2. Remove weight of car from front springs, using chain falls or crane.
3. Remove cotterpin and nut from front spring eyebolt. Drive out bolt.
4. Remove cotter from spring frame bolt top nut and remove nut.
5. Drive out spring frame bolt.
6. Remove two nuts from front spring clip and remove spring clip and plate.
7. Remove front spring as in Fig. 3. If spring leaves are to be replaced, remove front spring leaf retainer clip bolt and disassemble spring leaves. In assembling assemble leaves on spring bushing and rivet bushing slightly; clip leaves securely with retaining clip.
8. Place spring into position.
9. Put in front spring frame bolt, draw up and cotter.
10. Put on front spring clip, clip plate, lock washers and nuts—tighten.
11. Lower spring into spring yoke and put in spring eyebolt—put on nut and cotterpin.
12. Put on front splashers with two $\frac{3}{8}$ -in. cap screws, one $\frac{1}{2}$ -in. cap screw and two $\frac{1}{4}$ -in. stove bolts.
13. Remove crane or chain falls.

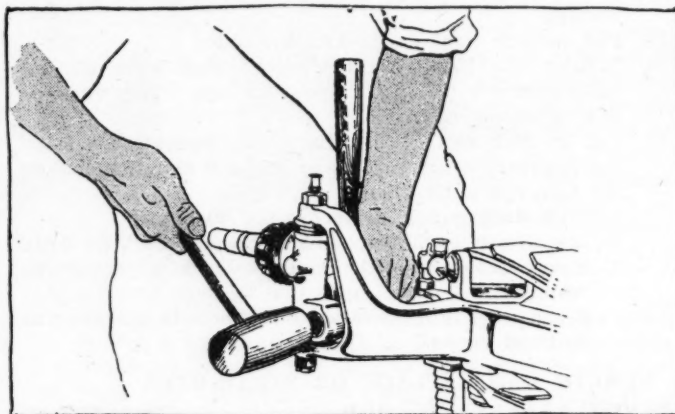


Fig. 2. Using lead hammer to drive out knuckle arm

TO REMOVE AND REPLACE RADIUS LEAVES

Time: 10 min.

1. Remove cotterpins from spring yoke and spring bolt nuts.
2. Remove nuts.
3. Remove radius leaves.
4. Assemble radius leaves to spring yoke and spring bolt.
5. Put on nuts. Tighten securely and cotterpin.

TO REMOVE AND REPLACE FRONT SPRING YOKES

Time: 1 hr.

1. Remove cotterpin from spring yoke nut.
2. Remove spring yoke nut.
3. With chain falls or crane, lift weight of frame from springs.
4. With soft hammer, drive yoke out of front axle.
5. Remove cotterpin from spring eyebolt.
6. Remove spring eyebolt nut.
7. Drive out spring eyebolt.
8. Assemble yoke to spring with spring eyebolt.
9. Put on nut and cotterpin.
10. Lower frame entering yoke in front axle.
11. Drive to position with soft hammer.
12. Put on yoke nut. Tighten securely and cotterpin.

TO REMOVE AND REPLACE REAR SPRING

Time: 50 min.

1. Remove bolt holding tire carrier to body.
2. Remove rear splashers and tire carrier by removing cotterpin and rear spring frame bolt nuts.

3. With crane or chain falls, lift weight of body and frame from rear springs.
4. Remove cotterpin and nut from rear spring shackle bolt.
5. Drive out bolt.
6. Remove nuts and lock washers from spring clips.
7. Remove spring clip plate.
8. Remove spring clip.
9. Remove nut from rear spring frame bolt.
10. Drive out rear spring frame bolt.
11. Remove spring. If spring leaves are to be installed, remove spring leaf clip bolts and pry leaves off of spring bushing. After leaves are assembled on bushing, rivet bushing slightly and clamp with leaf clips.
12. Replace spring.
13. Put in rear spring frame bolt.
14. Put on rear spring frame bolt nut.
15. Put on spring clip, plate, lock washer and nuts. Tighten securely.
16. Lower frame and install rear spring shackle bolt at axle end.
17. Put on nut. Tighten securely and cotterpin.
18. Remove crane or chain falls.

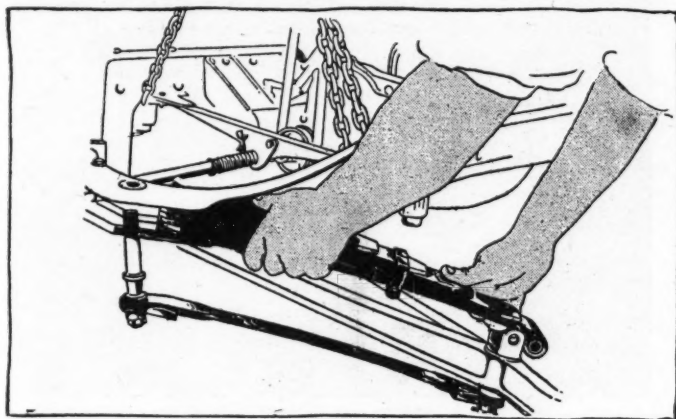


Fig. 3. Removal of front spring

TO REMOVE AND REPLACE LEFT REAR SPRING SHACKLE

Time: 30 min.

1. Remove cotterpins from both spring shackle bolt nuts.
2. Remove nuts.
3. Take weight of frame off springs with jack, crane or chain falls.
4. Drive out both shackle bolts.
5. Remove shackle.
6. Replace shackle.
7. Replace shackle bolts.
8. Put on shackle bolt nuts. Tighten securely and cotterpin.
9. Remove jack, crane or chain falls.

TO REMOVE AND REPLACE STARTING MOTOR SWITCH

Time: 20 min.

1. Disconnect one battery cable at battery and lift out floor board, using screwdriver.
2. Remove battery to switch, switch to starting motor and switch to indicator wires by unscrewing two nuts on starting motor switch.
3. Remove four 1/4-in. nuts and lock washers from switch brackets and remove switch, using screwdriver.
4. Replace switch with lock washers and nuts, using screwdriver.
5. Replace battery to switch, switch to starting motor and switch to indicator wires, making connections with two nuts on starting motor switch.
6. Connect cable at battery and replace floor board.

TO REMOVE AND REPLACE FRONT FENDER

Time: 45 min.

1. Remove three cap screws with nut and lock washers holding fender bracket to frame side member.
2. Remove four 1/4-in. stove bolts, lock washers and nuts

from fender and side splashers.

3. Remove two cap screws, lock washers and nuts from frame side member and fender.
4. Remove two 1/4-in. carriage bolts, lock washers and nuts, holding fender to running board. Remove radiator shell holding down bolt.
5. Remove fender.
6. Place new fender in position.
7. Fasten fender to frame side member through fender bracket with three cap screws, lock washers and nuts.
8. Fasten fender to running board with two 1/4-in. carriage bolts, lock washers and nuts.
9. Connect side splashers to fender with four 1/4-in. stove bolts, lock washers and nuts, and to frame with two cap screws. Replace radiator shell holding down bolt.

TO REMOVE AND REPLACE RUNNING BOARD

Time: 30 min.

1. Remove four 1/4-in. nuts and lock washers holding running board to fenders.
2. Remove four 1/4-in. nuts and lock washers holding running board to running board bracket.
3. Remove tacks holding splashers to running board.
4. Remove running board.
5. Assemble running board to running board bracket.
6. Put on four lock washers and four 1/4-in. nuts. Tighten securely.
7. Assemble front and rear fenders to running board with four 1/4-in. lock washers and nuts. Tighten securely.
8. Tack splashers to running board.

TO ALIGN FRONT WHEELS

Time: 15 min.

1. With a long stick, measure the distance at the front of the wheels from the inside of one felloe band to the outside of the felloe band on the opposite wheel. Then measure at the rear of the wheel in the same way. The distance between the two should be approximately 1/8 in. greater at the rear than in front. If the wheels do not toe in this much, remove the tie rod yoke end bolt from the adjusting yoke. Loosen clamp, locking yoke to tie rod and adjust yoke until the approximate distance is obtained. Clamp yoke tie rod and assembly to steering arm with yoke bolt, nut and cotterpin.

TO REMOVE AND REPLACE REAR AXLE GREASE RETAINING WASHER

Time: 20 min.

1. Jack up rear axle.
2. Remove rear wheel hub cap.
3. Remove cotter pin from rear axle shaft nut.
5. With wheel puller, remove wheel.
6. With screwdriver, remove steel washer.
7. Remove grease retaining felt washer.
8. Install new felt washer.
9. Install steel retaining washer.
10. See that rear axle shaft key is in position.
11. Put on rear wheel.
12. Install rear axle shaft nut. Tighten securely and cotter pin.
13. Put on hub cap.
14. Remove jack from under axle.

TO REMOVE AND REPLACE REAR WHEEL BEARING

Time: 25 min.

1. Jack up rear axle until wheel is free from floor.
2. Remove hub cap.
3. Remove cotter pin from rear axle shaft nut.
4. Remove rear axle shaft nut.
5. With wheel puller, pull off rear wheel.
6. With puller pull off wheel bearing.
7. Replace rear wheel bearing, packing with grease.
8. See that rear axle shaft key is in proper position.
9. Assemble wheel on shaft.
10. Put on rear axle shaft nut. Tighten securely and cotter pin.
11. Put on hub cap.
12. Remove jack.

Standard Mechanical Operations in Tractor Service

by John Charles Thorpe, M.E.
and Gustav Howard Radebaugh



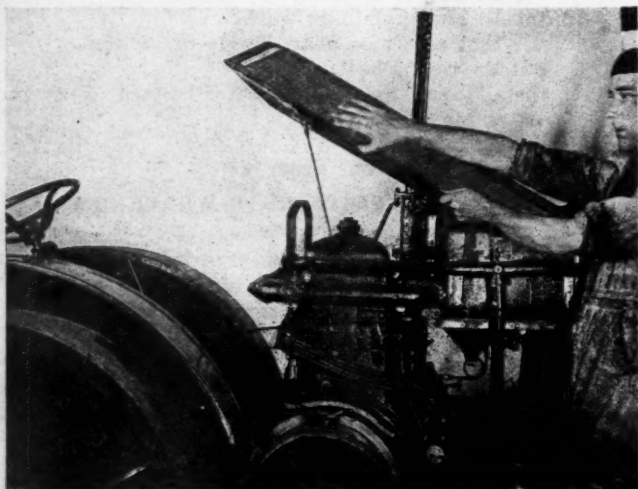
EDITOR'S NOTE: In last week's issue of *Motor Age* we told about the theory of magnetism as it applies to the magnetos used in the ignition systems on engines. The two pages herewith are the third of a series covering the service operations on tractors, although the same can be applied quite generally to passenger car and truck engines. This installment deals with the subject of spark plugs, the illustrations showing the procedures necessary in tracing down a faulty plug and making the adjustments. The operations are carried out exactly in the order in which the illustrations are numbered.

Ignition Troubles Caused By Faulty Spark Plug

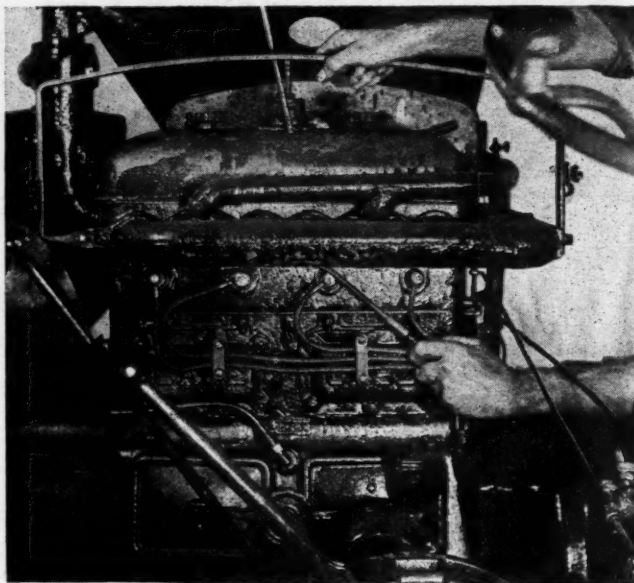
One of the most common causes of interruption in tractor operation is found in faulty spark plugs. These faults may be classified as follows:

1. Improper gauge of firing points.
2. Broken or cracked porcelain or insulator.
3. Carbon or oil deposits on the plugs.
4. Burned or corroded firing points.

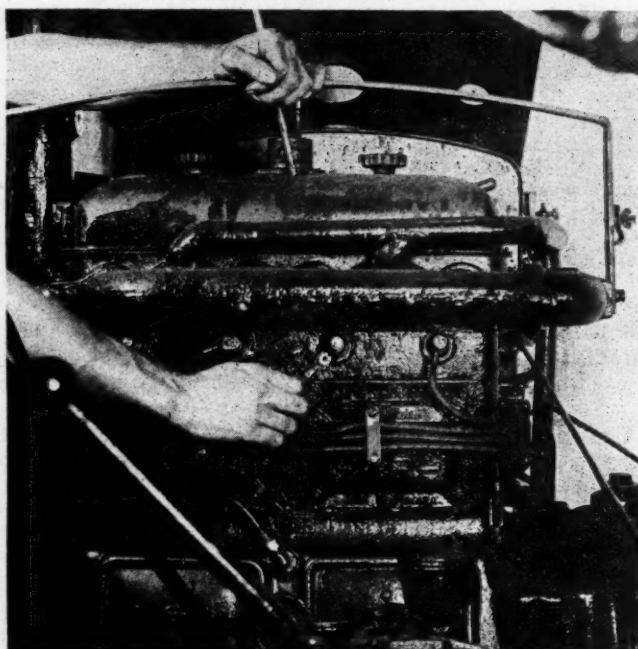
The following eight illustrations show the procedure in locating and testing for a faulty spark plug on the tractor engine. The same methods can be applied to passenger car or truck engines.



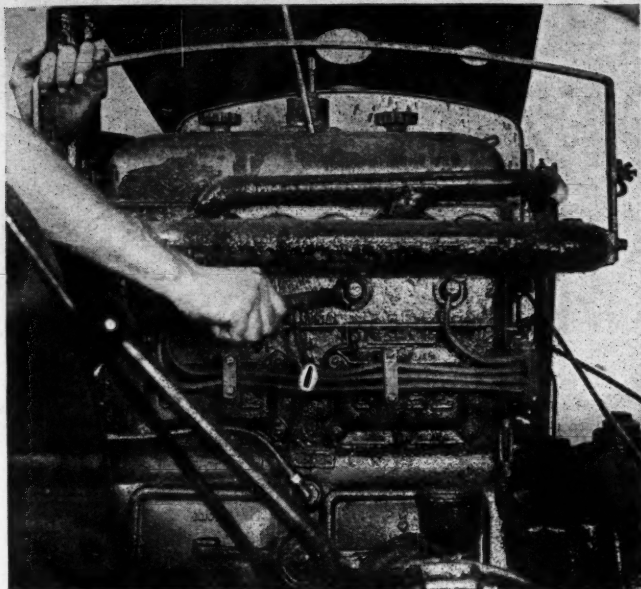
Procedure 1. Raise or remove hood from engine to expose spark plugs for inspection. Hood should be entirely out of the way to give free access to plugs



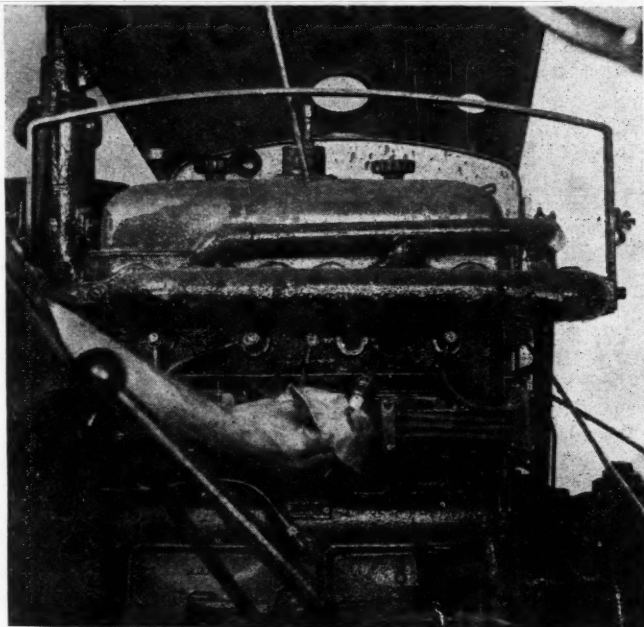
2. Using screw driver furnished with tool kit, with a firm grip on the handle (do not touch metal part), make metallic connection between spark plug terminals and engine cylinder block



3. Locating faulty spark plug with engine running. Observe the speed of the engine and continuity of explosions. If shorting the ignition current across the spark plug makes a change in the engine speed or the continuity of explosions, the plug just tested is doing its work. Proceed with tests of other plugs in regular order until the operation fails to reduce the engine speed and the order of explosions. This locates the faulty plug



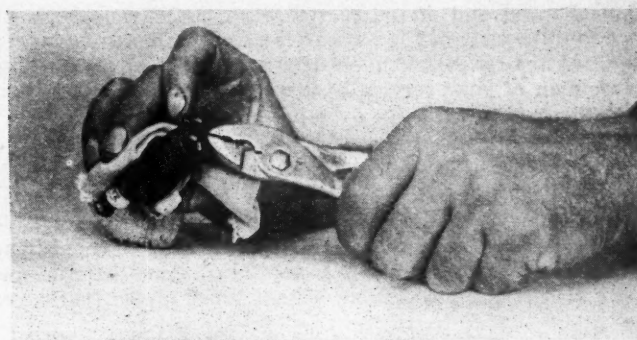
4. Locating fault of spark plug not properly gauged. Stop engine. Disconnect ignition cable from terminal of faulty plug. There are several kinds of cable connectors for spark plugs. If the connector is not a "slip on," a pair of pliers may be necessary to loosen cable. Using care not to strike porcelain of spark plug, place wrench provided in the tool kit for this purpose, over the faulty plug



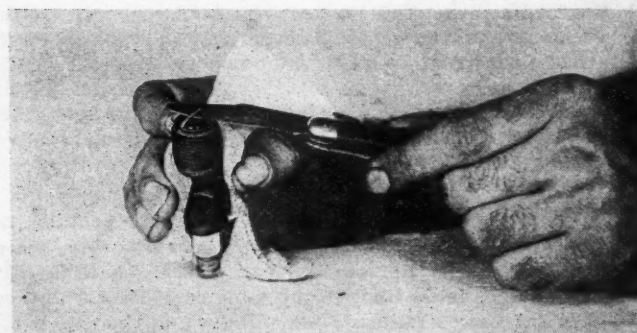
5. Remove faulty plug from cylinder block or firing head, using waste or piece of cloth for holding plug in hand for the inspection of the firing points



6. Test distance between electrodes or firing points, or in other words the gauge of the plug with a .025 in. thickness gauge or with special spark plug gauge furnished by many of the manufacturers. In lieu of such gauge, a worn dime may be used



7. If gauge of points is more than .025 in., close gap to proper distance by use of pliers. Extreme care must be exercised in this operation in order that the electrodes may not be damaged



8. If gap or gauge of plugs is too close, open to proper distance, .025 in., by inserting knife blade. Having corrected gauge of plug, insert carefully in spark plug opening and tighten, using care not to strike porcelain when removing wrench. Connect ignition cable and start engine

YOU see in pictures on these two pages mechanical operations often referred to in discussions about spark plugs. You have been told to do this or that, but have not been shown how.

By following this series you will have unfolded before you a motion-picture method of performing service operations on automotive products.

Next week we shall show another series on the spark plug, showing how to tell a plug with a broken insulation, how to clean plug parts so they will not be damaged, and many other important items.



EDITORIAL



Let's Have Cleanliness in the Service Station

IN addition to having service work well done, there is another element creeping in, in these days, when milady drives the car into the service station, namely, **CLEANLINESS!** And it must be whole and complete. The men on the job must be attired in clean garb and their utterances must be tolerable. There is no excuse for the men shouting at one another in language unfit to print, in voice pitched so it can be heard anywhere in the building.

REGARDING the apparel of the men, it is plain that the mechanical end of the service business may be performed ever so diligently, but if the car is returned to the owner in a condition that makes it necessary for him to have it cleaned, his opinion of your service as a whole depreciates to a figure somewhere near zero.

CLOSED cars are becoming more popular than ever. Records show that in the case of some firms closed jobs predominate. With the increasing popularity of the closed car, clean service becomes of greater and greater importance. Upholstering on these cars is generally of some material more easily soiled than the durable leather finish of the touring car.

Consequently it becomes a simple matter to soil the tapestried interior of the closed car. And here is where the inspector who passes final judgment upon the completeness of the work plays an important part.

VERY often a complaint is rendered unjustly. There may have been some spot on the interior finish of the car which had passed the owner's attention unnoticed. And when the car is returned from the service station, he finds this soiled portion of the seat. This man reaches one conclusion, and that in very short time. His service work henceforth will be done at some other place. No soothing will pacify this man, if he is convinced that the spot on the seat covers of the car resulted from the greasy attire of some mechanic, even though this is not actually the case. There are such people in his world.

HOW much more simple it would be if the inspector, when looking over this car, and on finding the spot, removed it with some prepared eradicator that would take possibly two or three minutes of his time, instead of passing it by with the mental analysis that since it is there as no result of our shop's work it was there before the car came in, so let it be.

Don't Abandon the Good Roads Campaigns

ACTION was taken by the American Road Builders' Association at its convention last week at Louisville, Ky., as favoring the continuance of the Federal Aid appropriations for good roads construction and maintenance. The action was taken because it was rumored that the Government, disappointed because all the Federal Aid money appropriated last year was not taken by the various states, was about to discontinue the Federal Aid allotments.

GOOD roads are of importance to the whole country, but they vitally affect the business of the automobile dealer. Without good roads, the market for cars is limited. With good roads, there is no limit to the number of cars which can be sold in the United States. Therefore, the automobile dealer

should make it of first importance to keep up the agitation for good roads.

WE cannot afford to be lulled into inaction by the fact that the importance of good roads is generally agreed upon. Good roads will not build themselves and the money to build them cannot be found on bushes. Now more than ever must the motor car dealer continue his agitation for better roads, for the big sums which have been voted by the various states in the last few years for this purpose have inclined many persons to believe that all was done which could be done. The contrary is true. What has been spent or appropriated for good roads is not a tithe of what must be spent if America's roads are to be on a par with America's road requirements.

The Need of Co-operation

WICHITA'S Tractor Show last week is reported to have suffered considerably because of a poor selection of dates. It is declared the Wichita show was held so near the Kansas City event that dealers and even factory representatives refused to attend both, and as the Kansas City show was a national event, threw their patronage to it. The number and class of exhibits is said to have suffered from the same causes.

THIS is not as it should be. Kansas City and Wichita, instead of co-operating and both reaping the fruits of co-operation, are working at cross purposes and both are losing. **MOTOR AGE** does not presume to pass upon the merits of the

dispute. It knows that the dispute, whoever is to blame, is hurting the tractor industry as a whole and as such is interested in seeing the dispute adjusted.

TO a lesser extent, perhaps, the dealer associations have offended in the motor car industry. Too often we have seen one city holding a show one week and another perhaps fifty miles away, holding another the following week.

THIS is not as it should be. Show dates should be selected which will not give any one section too many shows in too brief a period of time. Co-operation is needed and the best way this co-operation can be secured is through the National Automobile Dealers' Association.



General view of the Wichita Tractor and Thresher Show

Wichita Show Is Missing Fire Again

Bad Season of the Year Is Picked for Kansas Tractor Exhibit and Attendance Suffers As a Consequence of Bad Selection

WICHITA, Kans., Feb. 11—When Wichita comes to a realization that her show should be held at some other season of the year which will not conflict with the National Tractor Show, and when she comprehends the real function of her exhibition, then the Wichita Tractor Show, and Thresher Show will be worth while. That is, it will be worth while for somebody to go to it.

As a show it is really very much worth while now, but as it is being run at present it misses fire because the wrong idea is behind it. This is proved, not only by the character of the show itself, but by the fact that dealers will not come to Wichita this week and then go to Kansas City next. Properly placed in the calendar, Wichita can accomplish great things for the tractor industry with her show, she is missing.

The show is principally one designed to interest dealers and

farmers in the operative equipment, which is applicable to farming operations in the winter wheat section of the great west. Nor will it ever be anything else, no matter how hard Wichita may try to give it a national aspect. It is a sectional show and that's all it can be, and the sooner Wichita realizes this fact and makes the best of it the sooner she will have a really big and important show.

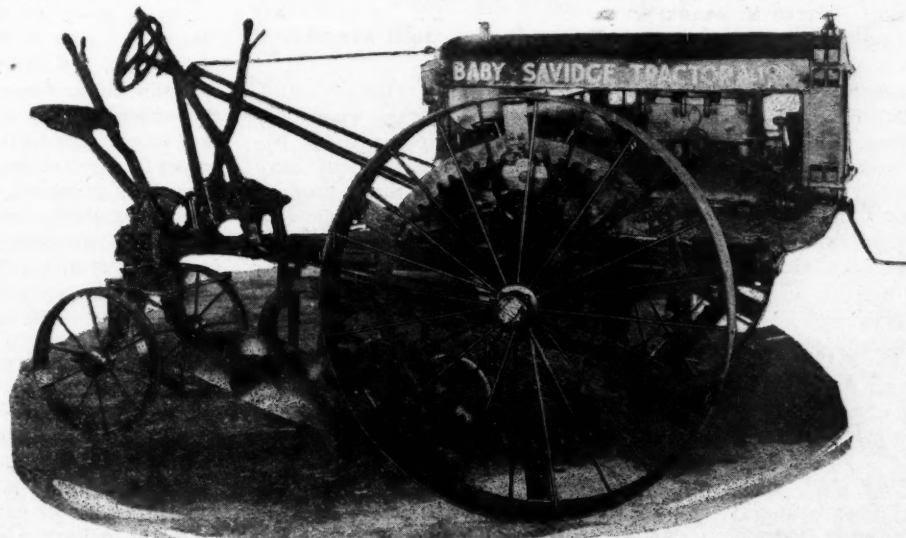
For Wichita stands in the midst of the

greatest winter wheat growing area in the world and she can, if she will, exert a tremendous influence toward the motorization of the great south west. A night's ride west of Kansas City, as Wichita is, she can, if she will, forget her jealousy of the larger town as an implement distributing point and grow rich and powerful as a power farming center by devoting herself to the wonderful power farming opportunities which lie right on her doorstep.

So much for what Wichita ought to do.

What she is doing this year is putting on a really wonderful show which apparently is not being properly appreciated either by the citizens of Wichita nor by the dealers and farmers in the territory which is tributary to Wichita.

The show is predominantly an exhibition of machinery for the growing of wheat from the time the



This "Baby" is a new general purpose tractor of 2-plow capacity—shown for the first time at Wichita

(Continued on page 51)

Car Production in January Suffers a Minor Slump

Influenza, Lack of Railroad Freight Cars and Uncertainty of Labor Situation Are the Principal Causes of Dropping off

DETROIT, Feb. 13—

Driveaways of the finished product and drive-ins of materials will have to be the salvation of production schedules in the Detroit manufacturing district for the next few weeks if January experiences of the makers are a criterion. January production was below schedule save in isolated instances and there is little hope held out of any radical improvement until the weather improves considerably.

Lack of freight cars, bad weather, uncertain labor conditions and the influenza epidemic are held responsible by the manufacturers for their failure to keep up to their schedule. They hope for some improvement in February but there will be no radical change for the better until the weather moderates and the present prevalence of influenza subsides to a marked extent. The freight car situation, they declare, cannot be bettered until a sufficient time has elapsed after the return of the roads to their private owners to permit of the latter getting back to normal schedules.

In the meantime, the situation is being met as far as possible by driveaways and delivery of materials to the factories by motor truck. So far, the roads out of Detroit to the southern territory, to the east and as far west as Iowa have been in sufficiently good condition to permit of driving finished cars to their destination by dealers and in this way the makers have been able to

January Car Production

Car.	Company.	Location.	Total.	Daily Avg.
Briscoe	Briscoe Motor Corp., Jackson, Mich.		1,000	34
Buick	Buick Motor Co., Flint, Mich.		15,000	500
Cadillac	Cadillac Motor Car Co., Detroit.		400	14
Chalmers	Chalmers Motors Car Co., Detroit.		1,200	40
Chevrolet	Chevrolet Motor Co., Flint, Mich.		4,000	135
Columbia	Columbia Motors Co., Detroit.		600	20
Dodge	Dodge Brothers, Detroit.		16,500	550
Dort	Dort Motor Car Co., Flint, Mich.		2,500	84
Essex	Essex Motors Co., Detroit.		3,750	125
A-Friend	Friend Motor Corp., Pontiac, Mich.			
Ford	Ford Motor Co., Detroit.		96,000	3,200
B-Handley-Knight	Handley-Knight Co., Kalamazoo, Mich.			
R-Harroun	Harroun Motors Corp., Wayne, Mich.			
Hudson	Hudson Motor Car Co., Detroit.		3,000	100
Hupmobile	Hupp Motor Car Corp., Detroit.		1,600	55
Jackson	Jackson Motors Corp., Jackson, Mich.		100	4
King	King Motor Car Co., Detroit.		200	7
Liberty	Liberty Motor Car Co., Detroit.		350	12
O-Lincoln	Lincoln Motor Co., Detroit.			
Lorraine	Lorraine Mot. Corp., Gr'd Rapids, Mich.		30	1
Nelson	E. A. Nelson Motor Car Co., Detroit.		120	4
Maxwell	Maxwell Motor Co., Detroit.		6,700	225
Oakland	Oakland Motor Car Co., Pontiac, Mich.		3,800	127
Oldsmobile	Olds Motor Works, Lansing, Mich.		3,700	124
Overland	Willys-Overland Co., Toledo, Ohio.		13,060	435
Packard	Packard Motor Co., Detroit.		1,920	64
Paige	Paige-Detroit Motor Car Co., Detroit.		1,300	43
Paterson	W. A. Paterson Co., Flint, Mich.		220	7
Reo	Reo Motor Car Co., Lansing, Mich.		1,200	40
Roamer	Barley Motor Car Co., Kalamazoo, Mich.		110	4
Z-Saxon	Saxon Motor Car Co., Detroit.			
Scripps-Booth	Scripps-Booth Corp., Detroit.		750	25
X-Studebaker	Studebaker Corp. of America, So. Bend		4,200	140
K-Willys-Knight	Willys-Overland Co., Toledo, Ohio.			
D-Wills-Lee	Wills-Lee Corp., Detroit.			

Total.....185,310 6,119

A-Friend Motor Corp., formerly Olympian Motor Corp., not yet in production on new FRIEND car.

B-Handley-Knight Co., not yet in production.

R-Harroun Motors Corp., recently refinanced, not yet in production.

O-Lincoln Motor Co., in production April 1.

Z-Saxon Motor Car Co., not in production on new car until March 1.

X-Report on Detroit plant. Production at South Bend, just starting on new six.

K-Production started on Model 20 KNIGHT Feb. 1. Only a few produced in January.

D-Wills-Lee Corp., not in production until summer.

produce all the cars they could. Owing to the lack of storage space for finished cars, however, if the roads become impassable, the makers will have to voluntarily cut down their production because they will have no place to put their product.

Inbound shipments of parts and ma-

terials have been aided considerably by the use of motor trucks. The inbound freight received by railroad is only a fraction of what it is in normal years and had not the motor truck freight service been developed to a considerable extent during the last three or four years, the factories would have had to curtail their production even more seriously than has been the case. By use of the trucks, however, makers have been able to get almost as great supplies of parts and materials as their manufacturing capacities, interfered with in other ways, have been able to absorb.

The influenza epidemic has had the effect of slowing up production to a considerable extent due to the cutting down of working forces. The deaths of several prominent men in the automobile industry in the Detroit district threw a scare into others and as a result officials and workmen leave their desks and workbenches at the earliest symptoms of illness. The result was that some factories lost as many as 20 per cent of their normal working forces.

While there have been no labor disturbances worthy of mention, the general uneasiness in the labor market is as acute in the automobile field as it is in any other industry. As a rule, however, the automobile men are well satisfied with their working conditions and there is no grave danger of disturbances.

BRISCOE PRICE IS \$1185

An error was made in our January 29 issue in stating the price of the Briscoe touring car as \$1285. The price is \$1185.

GOVERNMENT CARS MUST PAY TAX

Atlanta, Ga., Feb. 16—All government owned motor vehicles operated in Georgia will hereafter be required to pay a motor vehicle license tax, according to a decision handed down by Clifford Walker,

Attorney General for Georgia. The decision was rendered following a request for a legal opinion, made by S. G. McLendon, Secretary of State. As the government is not required to pay tax on property holdings it was desired to secure a legal opinion as to motor vehicles.

As a result of this decision an effort will be made to collect a tax from all trucks and cars owned and operated in the state by postoffices, the army or

navy, or any government owned and operated organization.

SPACKE TO BUILD IN INDIANAPOLIS

Indianapolis, Ind., Feb. 16—The Spacke Machine and Tool Co., manufacturers of the Spacke motor car engines and Spacke axles, is to have a new factory on a 23-acre site recently purchased here. The capital stock of the company has been increased to \$3,750,000.

Kansas City Opens Its Tractor Show

Willy-Overland Building Houses What Promises to be the Most Successful Exhibition of Power Equipment Ever Held

KANSAS CITY, Feb. 17—The National Tractor Show opened here to-day in a blaze of glory. It is the biggest thing of the kind in the history of the power farm equipment trade. Last year when the doors were opened at the temporary building which stood on the Union Station Plaza, the impression one got was almost overpowering because of the immensity of the show. Such an impression hardly will accompany a first view of the show this year, although in extent and in number of exhibits the 1920 event far surpasses that of 1919.

Occupies Overland Building

The show occupies three floors in the Willys-Overland building, and for this reason gives an opportunity for a much more rational arrangement of the exhibits than was the case at previous shows. The first floor is devoted to the heavier and larger exhibits—larger in the sense of being the full line exhibits. On the second floor are the lighter tractors, while on the third floor will be found all of the accessory displays. This arrangement is very much better than that of last year where everything was mixed up.

Another clever thing which has been done is the painting of the booth number on every sign throughout the exhibit, thus, with a guide to the show, anyone can proceed directly to the booth occupied by a company one desires to see because the numbers run consecutively, and the plan easily can be comprehended.

Decorations Are Unique

While the decorations are not yet fully in place, still enough has been done to give some idea of the general ultimate effect. On all three floors the side walls are covered with canvass on which in panels are landscapes separated by decorative panels or flag panels. The walls waist high have either a plain wainscoat effect, or as on the second floor, will represent a waist-high stone wall. The effect is unique and pleasing.

On the first floor the pillars are surrounded by banners depending from lattice work squares at the top covered with vinery. Below is a large circular medallion showing a gilt wreath surrounding an orange center on which is painted in blue the insignia of the club, K. C. T. C. The roof is covered with bunting, while triangularly across the constructional squares run festoons of vinery carrying strings of incandescent lights. A pendant light with reflector hangs from the center of each square.

Practically the same decorative scheme is followed on the second floor, although

the circular shields here are replaced by pennant shaped shields in blue and orange—the colors of the show; also bearing the club insignia. On the third floor the dominant feature of the decoration is lattice work both on pillars and in the way of railings which separate the booths. The color scheme on this floor is largely green and white, while on the other floors the orange and blue of the Kansas City Tractor Club predominates.

Practically every tractor manufacturing company and every company manufacturing tractor accessory parts, as also nearly every company in the country making power farm equipment, is represented by a comprehensive display. The inevitable impression the visitor will gain from the show is that the tractor and power farm operative equipment industry of this country is enormous, and that it has taken its place side by side with the motor car industry and the motor truck industry, as one of the big businesses of this era.

To Keep Check on Attendance

An unofficial check will be made during the week of the show on the character of the dealers who attend and the degree of interest they manifest. The purpose is to get some line, if possible, upon the class of dealers who will be the future tractor dealers of the country.

At the present time, as far as the west and the southwest are concerned, dealers are about equally divided as between implement dealers and motor car dealers. It is hoped the attendance at the show will reveal something decisive as to the direction in which the tractor trade is to go.

A feature of importance during the show will be the semi-social functions which will be put on. On Tuesday evening at the Hotel Muehlebach, the Avery Co. will tender a reception and banquet to its dealers and its dealers' bankers.

The Avery Co. believes the tractor business has assumed such importance that the average dealer no longer can finance it without the hearty co-operation of his local banker. In order to impress the banker with the importance of the power equipment business and to sell him on the idea of co-operating with the dealers and farmers in his community, he has been asked to attend the Kansas City show and attend the Avery banquet. Already Manager Anderson has received so many acceptances that he says he will have from thirty to fifty bankers, in addition to from 200 to 300 dealers to entertain.

The Fordson dealers attending the show will be entertained by the G. T.

O'Maley Tractor Co., at a reception and banquet at the Hotel Muehlebach on the evening of Feb. 19.

As usual, the S. A. E. will give a dinner, this year at the Baltimore Hotel.

A number of similar entertainments are planned so that the visitors to the show will not lack for pleasurable entertainment.

JOHN W. WATT IS KILLED

New York, Feb. 16—John Willson Watt, vice president and one of the founders of the Automotive Service Association of New York, was found dead in the street here Saturday night. It is believed Mr. Watt was struck by an automobile. Mr. Watt was with the Reo company for fourteen years and for the last two years was in charge of service in the Metropolitan district.

DETROIT AUTOMOBILE CLUB MOVES ROOMS.

Detroit, Feb. 16—Detroit Automobile Club, which for four years has had its headquarters in the Hotel Ponchartrain, has moved to the Hotel Tuller. Commodious quarters facing Grand Circus Park have been secured and have been furnished and decorated attractively for the convenience and pleasure of members and guests. One of the best features of the new location is the fact that it is on the main floor of the hotel.

MEEDER HEADS SERVICE PLANT

Denver, Feb. 9—Herb Meeder has been appointed service manager of the Heiser Co., and Harry Plattner has been placed in charge of the shop. Extensive improvements are being made at service station and salesrooms at Broadway and Speer boulevard. The Oneida truck has been taken on this year for Colorado, New Mexico and Wyoming. The company during the past year sold Westcott, Velie and Ranner truck.

PACKARD HAS NEW HEAVY FUEL DEVICE

Detroit, Feb. 9—The development of a new appliance in the experimental laboratories of the Packard Motor Car Co. allows for the carburetion of low grade fuels, according to Col. J. G. Vincent, vice-president of the Packard Motor Car Co. The device, which is known as a fuelizer and which was developed by L. M. Woolson, heats the charge entering the engine by burning a small quantity of gasoline in the supplementary combustion chamber. It is said that the fuelizer makes motor car operation on a summer setting of the carburetor twenty seconds after the engine has been cranked, regardless of the temperature.

Detroit Plans for Show

Dealers' Association Concludes Year of Many and Varied Activities

Closed Car Salon is Held to Be Most Important Development of the Season

DETROIT, Feb. 12—Activities of the Detroit Automobile Dealers' Association during the last year have vindicated the judgment of sponsors for the organization and have demonstrated beyond question the truth of the old adage that "in union there is strength." While the staging of the annual automobile show stands out as the greatest of its activities, the many and varied undertakings which have been promoted have reflected great credit upon the officials and Manager H. H. Shuart, who has taken the lead in matters of interest to local dealers.

In blazing the trail for other cities by producing successfully the first closed car salon ever held, the association took a great step forward. This classic, while much smaller than the annual mid-winter show, was a high class exhibition and it attracted many leaders in the industry who are enthusiastic over its success. Club officials from many other cities attended the salon, skeptical at first but soon were awakened to a realization of its possibilities in view of the fact that the trend rapidly is toward the closed car for the all-year vehicle.

Business First

Aside from its show activities the association is primarily a business organization the chief object of which is to promote the interests of Detroit dealers and automobile owners in Detroit territory. The association is particularly fortunate in the fact that its affairs are in the hands of a board of directors composed of the most aggressive young blood in the industry. Under the administration of this board remarkable progress has been made during the year.

Permanent offices in the Garfield building, in the heart of Automobile Row, were established during the year. Mr. Shuart employed as manager to handle the details and institute and organize the association's efforts and activities. The fundamental principle of the association, the placing of the business of retailing on a higher plane, has at all times been uppermost in the minds of the officers and directors and their every effort has been bent to enhance the interests of the members and at the same time assure a square deal for the owner and the manufacturer.

One of the most important features of the association's work during the year has been the stabilizing of the used car market in Detroit. Co-operation of the organization's forty members made possible the placing of the true valuation on practically every make and model of

used car and reports on these prices have been supplied to members for their guidance. The effort has worked with great success and to the real benefit of the car owners as well as the dealers.

A similar activity was inaugurated in the truck field and has proved equally successful. In conjunction with this feature an advertising and publicity campaign was carried out last fall in an effort to give the car buying public a more comprehensive idea of the value of the used car. This campaign will be followed out with more advertising during the next few months in the association's effort to lift the used car business to a plane as safe and sound as the transactions in new cars.

The building and maintenance of good roads not only in Michigan but throughout the United States has been one of the foremost of the association's activities. Officers and members have assisted in many good road campaigns and have formulated plans for engaging in the work to a greater extent in 1920. Good road propaganda has been and is being spread with a lavish hand and the association, working in hearty co-operation with the Detroit Automobile Club, has made its influence felt strongly in the road movement.

CHARLOTTE HOLDS SHOW

Charlotte, N. C., Feb. 16—The Charlotte Automotive Trade Association is putting on this week one of the most attractive little shows of the year. This is the first show put on in Charlotte in ten years, but judging by the public interest displayed, and the enthusiastic attitude of the trade, it is certain to be an annual affair from now on.

In fact, the big news of this event is a well defined movement to erect a new auditorium, which will be particularly adapted to house future exhibitions of this character. Charlotte is unquestionably destined to become one of the great automobile distributing centers of the U. S. Not only is it favorably situated to become such, but it has a particularly progressive and enterprising group of men in the automobile business. The show was in many respects quite an unusual one, including a remarkable special attraction in Arthur Pryor's Band, assisted by Miss George, prima donna. In the minds of many, there was considerable misgiving in regard to the engagement of so strong a feature for the program, many believing that it would detract from the attention given to the cars. This did not occur to any noticeable extent; although many people were unquestionably drawn to hear the concerts, there was a very alert and constant interest in the exhibits.

MAIBOHM PRICES ARE RAISED

Sandusky, Ohio, Feb. 15—Prices of all Maibohm models were increased, the change taking effect January 23 according to a statement issued by the Maibohm Motors Co. The five-passenger phaeton has been raised from \$1395, the Sedan from \$2100 to \$2395, and the chassis from \$1290 to \$1385.

Ask Further Road Aid

Builders' Association Favors Continuance of Federal Assistance to States

Government Disappointed Because States So Far Have Failed to Take Advantage of Offer

LOUISVILLE, Ky., Feb. 16—A continuation of government participation in highway construction beyond June 30, 1921, was favored at the convention of the American Road Builders' association in Louisville, which ended its five-day session Friday. The organization, through all its co-ordinate organizations, will urge legislation on congress looking to this end. Kentucky's tentative request for \$840,000 of the Federal government's \$200,000,000 appropriation for national road building will lapse July 1st, unless definite arrangements for raising a like amount in the state are completed before that time.

Thomas H. MacDonald, Bureau of Public Roads, Washington, told the assemblage that Federal authorities were disappointed at the seeming lack of interest on the part of individual states in the government's plan for building national highways. He said that only \$119,000,000 of the \$200,000,000 appropriation of 1919 has been asked for, and declared that the present appropriation would be in force only until 1921 and that he doubted whether congress would be willing to extend the time. He asserted that congress had held in mind employment for discharged soldiers when it passed the appropriation bill last spring. The speaker said the Federal government proposed that its representatives confer with state committees in determining what roads should be built or improved by government funds. He said permanent roads, built with standard materials, were favored by the government instead of sand, clay and gravel construction, these latter materials having been employed in a large percentage of recent road-building work.

NASHVILLE HOLDS SHOWS

Memphis, Tenn., Feb. 13—The Nashville Auto Show on at the Hippodrome at Nashville since Monday is a very decided success, with 60,000 sq. ft. of floor space there are more than sixty exhibitors. The decorations by Louisville parties are attractive. Gov. Roberts touched the button that started the show.

Next week is Tractor, Truck and Accessory week. The Shriners, Kiwanians Society, Nashville Automobile Club big special nights successfully put on. Also a parade of half a mile of autos. The musical programme is distinct and interesting. This is Nashville's eighth show. The Tennessee Automobile Dealers' association in session contemporaneously at the Hermitage Hotel appointed a committee on good roads.

Snow Hurts Wilmington

Blizzard Keeps Down Attendance at Annual Automobile Show in Delaware

Dealers Declare They Are Well Satisfied With Results Despite Handicap

WILMINGTON, DEL., Feb. 7—Wilmington's fifth annual automobile show, which closed tonight, although the first at which an admission was charged, proved the most successful of all from a business viewpoint. In view of the fact that it was necessarily held in limited quarters, the ballroom of the Hotel duPont, attendance, as well as exhibits, were restricted. It was possible to show only twenty-eight cars, though there was overflow space in another part of the hotel where all lines of accessories were shown. While an admission of 50 cents was charged, the exhibition hall was full nearly every night and well filled afternoons. A blizzard prevented larger attendance several days and nights. As it was, upwards of 4,000 persons paid admission.

According to the showmen, the business results have been better than ever before. Heretofore the crowd has been so large that it was impossible to demonstrate or in other ways interest prospects.

The admission feature practically restricted the show to persons who were interested in cars, and the result has been many orders.

The closing feature of the show was a dance, which was held in the duBarry room, overlooking the ballroom, and both were filled to suffocation at the finish. Music was furnished during the week by a talented local orchestra, which gave a great variety in music, vocal, as well as instrumental. The magnificent permanent decorations of the ballroom gave the show an artistic setting such as it never had before.

INSTALLS BATHS IN SERVICE STATION

Detroit, Feb. 18—The Columbia Motors Co. has been informed by Roy H. Brown, distributor in Sacramento, Cal., that in

building his new sales and service station he has installed eight baths for the convenience of tourists.

This looks like a practical idea. Thousands of tourists this season will adopt the camping-out plan, carrying their tents and equipment either on the running board or in trailers. In these days of congested hotels when it is almost impossible to get accommodations at any price, camping out on an automobile tour is the ideal plan. The greatest drawback has been the lack of facilities for cleaning up after a hot, dusty ride.

CALL ON DEALERS TO BUILD GARAGE

Cincinnati, O., Feb. 18—Automobile dealers in Cincinnati will be called on within the next few days by Mayor John Galvin to work out plans for the erection of a large public garage in this city, the cost to be defrayed by themselves

They Get the Glory for the Big Detroit Show



Credit for the great success of the 1920 exhibition staged by the Dealers' Association in Detroit, is given the officers of the organization whose never-lagging efforts in co-operation with those of Manager H. H. Shuart, resulted in an exhibition that from the standpoint of attendance, cars and trucks exhibited and artistic creation proved a record-breaker in the automobile city. Officers shown here from left to right are: A. L. Zechendorf, president; J. C. Ayer, vice-president; H. H. Shuart, manager; G. O. Simmons, secretary and W. D. Block, treasurer

or by any plan that the dealers approve.

Authority for the meeting was given in a resolution adopted by City Council but it did not become known until this week, after the return of a special committee on traffic suggestion from a tour of the East, that the city plans to put the garage problem squarely up to the dealers on the ground that they have made their money here and should spend some of it in this way.

This step is a part of the special committee's plan to relieve traffic congestion on the streets. The committee is to recommend stringent parking limitations for the business district and, since the city has no money to defray the cost of a garage in which to house machines taken from the streets, the automobile dealers will be asked to meet the situation.

Two Shows for Scranton

Passenger Cars and Trucks Will be Exhibited on Successive Weeks in March

Tractors Will Be Shown at the Same Time as Trucks for Benefit of Farmers

SCRANTON, PA., Feb. 17—Automobile truck and farm tractor dealers here have arranged to display 175 passenger cars, and 150 trucks and tractors in the two motor vehicle shows which are to be held in the Thirteenth Regiment Armory the first two weeks in March. The passenger car show will open on the evening of March 1 at 7:30 o'clock and continue until midnight of March 6. The motor truck and farm tractor exhibition will start on the afternoon of March 9 and close at midnight on March 13.

Hugh B. Andrews, manager of the shows, which will be conducted by the Scranton Motor Trades Association, announces that all available space for both exhibitions has been disposed of. There will be fifty displays of automotive equipment, in addition to the vehicles.

There will be twice as many passenger cars shown as there were at the last exhibition and fifty different makes of automobiles. There will be just three times as many trucks

shown as heretofore. Farm tractors are becoming very popular in this locality and many farmers have placed orders for early deliveries.

HOLDS PRIVATE TRUCK SHOW

Philadelphia, Feb. 16—The Swain-Hickman Co., Inc., distributor of Republic trucks, is holding a "special motor truck show" of its own, comprising the exhibit it displayed at the New York truck show, but which, because of delayed freight shipments, it was prevented from showing at the exhibition in Philadelphia. The exhibit includes an orchard sprayer, with tank mounted on a two and one-half-ton chassis. This is the first truck of this type ever shown in Philadelphia, a Republic all-purpose farm body on a one and one-half-ton chassis.

Louisiana Dealers Meet Lake Charles to Be Scene of Big Convention of Auto- motive Men in March

Early Reservations Indicate That at
Least 800 Delegates
Will Attend

LAKE CHARLES, La., Feb. 16—Although the big convention of the Louisiana-Mississippi Automotive Trades association is more than a month away reservations are pouring in on the local hotels for the meeting which will be held here March 17 and 18. This meeting will be the largest as well as the most important ever held by men in the automobile industry in the South, and approximately 800 delegates and others interested in automotive vehicles are expected.

The program, as tentatively outlined, contains the names of some of the leading figures in the automotive industry of this country, as the work of this southern bi-state organization and the recognition given it throughout the North has made it possible to give the dealers of the two states many features which otherwise could not be found outside the New York and Chicago national gatherings. One of the widely known men who will address the meeting is George M. Graham, of the Pierce-Arrow Motor Car Co., a leader in the truck field and prominent in the National Automobile Chamber of Commerce. Another speaker of national prominence will be E. S. Jordan, president of the Jordan Motor Car Co., who spoke at the recent meeting of the Georgia State association. Other speakers include F. W. A. Vesper, president of the National Automobile Dealers' association; Harry G. Moock, business manager of the National organization; A. W. Mitzler, president of the Ohio Automotive Trade association; W. L. Matheis, of Atlanta, president of the Georgia Automobile Dealers' association, and H. L. Robertson, head of the Texas dealers. Roger L. Morrison, who was one of the speakers at the Jackson, Miss., meeting some months ago, will be one of the good roads speakers at the Lake Charles convention.

COUNCIL BLUFFS SHOW

Council Bluffs, Ia., Feb. 12—Council Bluffs first annual independent auto show opened February 10 at the Auditorium with over thirty makes of cars on exhibit. Trucks, accessories and aeroplanes are included in the exhibits. Floor space is at a premium and splendid crowds assure a complete success in every detail. The decorations are unusual and exquisite and the lighting effects are pronounced perfect.

The executive board of the Auto Dealers' association is in charge and are enthusiastic over the success of their initial efforts. The board is composed of the following: F. D. Palmer, president; C. O. Nickel, vice-president; P. J. Johnson, treasurer; F. E. Hughes, secretary; Ben.

E. Bierer, E. A. Decker, G. W. Powell.

Arthur Smith's orchestra furnishes the music and special musical and vaudeville numbers are given daily. Each day is a special day, bringing large delegations. As an opening attraction the first day, Art Bluto, famous aeronaut, made a 4000 foot drop with parachute from aeroplane driven by Lieutenant A. L. Nielsen. This feat will be repeated Saturday, the last day of the show.

Sales are reported good thus far. The first sale was reported Tuesday, a few minutes after the opening of the doors. It was a Winton and the sale price was reported as \$5,500.

NASH GETS NEW BODY SUPPLY

Milwaukee, Wis., Feb. 16—The Nash Motors Co., which expects soon to commence quantity production of the new Nash four-cylinder passenger car in its new Milwaukee plant, has acquired a half interest in the Seaman Body Corp. of Milwaukee to insure a constant supply of open and closed bodies for the local plant as well as the six-cylinder plant at Kenosha, Wis. In addition, the Nash company is engaging in a large body works extension scheme at Kenosha which contemplates the immediate erection of a three or four-story brick and steel body shop, about 50 ft. wide and from 1150 to 1200 ft. long. The Seaman company operates four large factories in Milwaukee and recently started work on a mammoth plant at the northern city limits which will represent an investment of from \$2,000,000 to \$2,500,000. It is significant that this new plant will be devoted mainly to producing fine closed bodies.

FARGO DEALERS ORGANIZE AT SHOW

Fargo, N. D., Feb. 16—The seventh annual automobile show given by the Fargo-Moorhead Automotive Trade association was held in the new Berry garage at Fargo, N. D., Feb. 10 to 13. The show was confined to exhibits of automobiles, trucks and accessories and every available space in the four-story building was taken.

Approximately 350 out-of-town dealers attended the show, more than double the number that ever have been in attendance at any previous show. A banquet and trade frolic was tendered the visiting dealers by the local association at which covers were laid for 300 and every seat taken. The only address was given by G. A. Will of Minneapolis.

The dealers present organized the North Dakota Automotive Trade association. The following officers were elected: Lee Cowles, Valley City, N. D., president; Geo. M. Kenaston, Bismarck, N. D., vice president, and Harry Miller, Jamestown, N. D., secretary and treasurer. The matter of completing the organization, selecting directors to serve for the first year, was left to the officers. The object of the association is to further the good roads movement and promote better business methods and co-operation among automobile dealers.

The show was a record breaker both in point of attendance and sales closed.

Louisiana Gets Roads Stands First in Sixth District in Federal Aid Appropriations

Has Nineteen National Projects
Under Construction and Has
Spent \$1,233,001.38

NEW ORLEANS, LA., Feb. 16—Louisiana stands first among the four states of the Sixth Federal Road District in the number of federal aid road projects launched during 1919, according to the report of the Bureau of Public Roads at Washington. States included in the sixth district are Louisiana, Texas, Oklahoma and Arkansas. Louisiana has spent \$1,233,001.38 of federal aid funds on active projects, which is 32.9 per cent of the total amount allotted, \$3,741,751.52. Texas has expended \$1,321,198.59 out of \$16,821,198.59 allotted, her expenditure being 7.8 per cent. Oklahoma came next, with \$591,637.49 expended out of a total allotment of \$4,341,878.29, or 9.3 per cent. Arkansas is second to Louisiana with 13.5 per cent, or an expenditure of \$622,469.64 out of \$4,615,210.57.

Louisiana has thirty-six federal aid projects, nineteen under construction and two completed, a higher percentage of roads under construction and completed than any of the other states within this district except Arkansas, which exceeds Louisiana only in point of percentage of roads completed, which percentage is, for Arkansas, 5.9, and for the Pelican State 5.5. Louisiana has 52.7 per cent of her federal aid projects under construction, while the greatest percentage among the other three states is in Arkansas, where 39 per cent of federal aid road projects are under construction.

Duncan Buie, state highway commissioner, announces that 37 projects have been submitted to date to the Public Bureau of Roads, with a total mileage of approximately 403.12. Allotments to these projects total \$2,379,000, leaving a balance of about \$1,321,000 available for apportionment in 1921. The latest bid received by the state highway department of Louisiana was \$140,000 for the construction of 14.2 miles of hard-surfaced highway radiating out of Ruston, La. The highway department has not accepted any bids for nearly two months, on the grounds that all were too high, averaging more than \$10,000 per mile. Unsettled material prices and the high cost of labor are given as the reasons for the high bids.

TO BUILD BIG SERVICE PLANT

Charlotte, N. C., Feb. 16—C. C. Coddington has announced the plans for a service plant he will erect here this spring and summer that will cost about \$350,000 and be one of the largest and most modern garages in this section of the country. It will be six stories in height on a site 90 by 198 ft., with two freight elevators and one passenger elevator. A complete repair shop is included.

Hoosier Show Space Sold

Indianapolis Dealers Quickly Snapping All Available Exhibition Room

Four Classes of Automotive Vehicles Will Be Displayed in Big Event

INDIANAPOLIS, Feb. 14—Demand for space at the automobile show of the Indianapolis Automobile Trade Association, to be held March 8 to 13 at the new Manufacturers' Building at the State Fair Grounds, was so tremendous two days after the announcement that applications would be received that Manager John Orman found himself holding requests for 25,000 sq. ft. more than the building will accommodate. This was despite the fact that a large number of the members of the association had not made application. It became necessary to get out the managerial axe and chop off substantial portions of the space requests of many prospective exhibitors in order that everybody might be accommodated.

The Indianapolis show is to be unique in that four classes of motor vehicles, as well as accessories for each, are to be shown under one mammoth roof. Passenger cars, trucks, farm tractors and airplanes are to be included. Indianapolis Automobile Trade Association officials say this is the first time, in their knowledge, that airplanes have been exhibited at an automobile show.

What is expected to be the most beautiful decoration scheme ever used in any large show is being worked out. Frank J. Zimmerer designed the art. The plan is so extensive that a corps of artists had to start working last week in order to have the Manufacturers' building in readiness by March 8, when the show opens.

WOMAN EXHIBITOR AT BALTIMORE

Baltimore, Md., Feb. 13—For the first time in the history of automobile shows in Baltimore a woman was an exhibitor being the head of the Brooks Motor Co., Bell distributors. One would never know from looking at the sign, or on the letter head or other literature that a woman is the head of the industry for it merely says:

Brooke Motor Co.

M. A. Brooks,

814 Madison Avenue.

M. A. Brooks, happens to be Margaret A. Brooks, a hustling motor car dealer, who took over her husband's business when he died eighteen months ago. This was the first big show at which she had an exhibit although during the past summer she had an exhibit at several county fairs. Mrs. Brooks is a hustler. She expects to sell no less than 500 cars during the coming year. Besides having the state of Maryland she also has Dela-

ware, West Virginia and Northern Virginia as her territory.

Through the severe storms during the show she kept her promise and made trips to the home of prospects and brought them to the show in her car. "It was pretty rough driving," said Mrs. Brooks, "but I didn't mind it in the least because I proved the worth of the car to my prospects. You see I have been driving for some time and it was just a real test for me as well as the car and I think that helped me in making sales. Several of the prospects were in the suburban sections and the manner in which I handled the car convinced the women, whom I brought to the show and then took back to their homes how a woman could meet any emergency."

BOSTON MEN PLAN FOR "OPEN HOUSE"

Boston, Feb. 17—All the Boston dealers are making plans now for the annual open house they are to have on Washington's birthday. Each year this has become a big pre-show event, attracting thousands of motorists to the salesrooms, which in many instances are decorated, and where orchestras and moving pictures are added features. Out of town dealers come in with prospects to show more types of cars than they have on hand.

This year the holiday will be celebrated on Monday. By that time Boston will have dug itself out of the snowdrifts; the weather will be more congenial, and there being no place to go the prospective motorists and the car owners will make the rounds. Because so many new salesrooms have been added on Commonwealth avenue all in a row, and so many new lines have been taken on here, there will be a greater attraction than ever. The Open House idea originated with Alvan T. Fuller, of the Packard, who made it a remarkable success until now every dealer finds it one of the best days of the year for prospects, and also for sales. And the used car men, too, take advantage of it now so that it means a lot in dollars and cents to all in the industry, when formerly the day was wasted for the dealers and salesmen merely stuck around somewhere to pass away the time.

PHILADELPHIA HAS AN AIR SHOW

Philadelphia, Feb. 13—On March 22, Philadelphia's Aeronautics Show of 1920 will open in the First Regiment Armory, in the heart of "Motor Row," to last until March 27. It will be under the auspices of the Chamber of Commerce, the Franklin Institute, the Aviators' Club of Pennsylvania, the Aero Club of Pennsylvania and other allied organizations. Major Charles J. Biddle, of Philadelphia, a member of the advisory committee of the show, announces that the organizations will try to "get the airplane industry established here, work for the establishment of air lines to nearby cities, establish a large municipal landing field and a force of aerial police."

Equipment to Have Show

Accessory Men Find Des Moines Spaces Too Small to Suit Their Fancy

Only Day Sessions Will Be Held at Independent Display Given by Jobbers

DES MOINES, IOWA, Feb. 15—Des Moines is to have a complete automotive equipment show entirely independent of, but in no way competing with the Des Moines show during the week Feb 16-21.

Because automotive equipment was crowded out of the Des Moines Motor show on account of the lack of space a number of the Iowa jobbers got together and decided to hold an equipment show at the Auditorium during the week of the motor show. There will be between eighty and 100 exhibits, many of which were at the Chicago show. Admission to the show will be to dealers, jobbers and garagemen only and the general public is not to be admitted. There will be no night show.

A feature of the show will be a model garage, completely outfitted, constructed in a space 30x40 ft.

Jobbers who are co-operating in the show are the Hippee States Co., Des Moines; Iowa Auto Supply Co., Des Moines; Downing Electric Co., Des Moines; U. S. Rubber Co., Des Moines; Cedar Rapids Pump Co., Cedar Rapids; Repas Auto Co., Waterloo; Schultz Auto Co., Sioux City, and the Sioux City Iron Co., Sioux City. George F. Hippee of the Hippee-States Co., will be manager.

In addition to the Auditorium show Des Moines will have still another full-fledged equipment show during motor show week, namely the fourth annual Herring show. It will be held on the second floor of the Herring Service building and more than a score of manufacturers whose products the Herring Motor Co. jobs will co-operate in making it a success.

FOUR TOWNS COMBINE FOR SHOW

Ottawa, Ill., Feb. 14—Ottawa, LaSalle, Peru and Streator dealers will combine to make Ottawa's Automobile Show this season an extremely ambitious project. The show is to be held at Armory C in Ottawa on Feb. 26, 27 and 28 and space will be rented to dealers from other cities who may wish to exhibit their cars.

The show building has been divided into fifty booths, both main floor and basement having been utilized. The main floor is to be used for passenger cars and accessories while trucks will occupy the basement. Virtually all the show spaces have already been bespoken by dealers and it is expected there will be many dealers who will have to stay out of the exhibition because of lack of room.

Twenty-one Cars Entered in Los Angeles Speedway Race

LOS ANGELES, Feb. 19—The first automobile race of the year that will be counted in determining the championships for 1920 will be run here Saturday, Feb. 21. The contest will be for 250 miles and a purse of \$25,000. It will be the first event on the new mile and one-quarter board speedway that was completed only a few days ago. The number of entries was limited to eighteen and qualifying events were necessary to determine the contenders.

The completion of a speedway plant of such size and importance as the one here, which is located only a few miles from the city in the Beverly Hills district, and the running of the first race of the year are expected to bring forth the largest crowd that ever attended a sporting event on the Pacific coast. Reservations have been made for delegations of visitors to represent cities as far north as Portland, Oregon and Tacoma, Wash.

The entrance of Los Angeles into the "big league" of racing events has brought about the award of a liberal number of points that will be counted in determining the 1920 championship under the rating of the A. A. A. The apportionment of points for place are as follows: First, 500; Second, 260; Third, 140; Fourth, 80; Fifth, 50; Sixth, 30; Seventh, 25; Eighth, 15; Ninth, 10; Tenth, 5. This means that whoever wins this race will have a fair start for the season.

The \$25,000 purse is said to be the largest ever offered in the West for a race of this length.

In preliminary turns about the track such as drivers are accustomed to make in trying out their cars a speed of 110 miles an hour has been common. Some of the drivers have asserted the Los Angeles speedway is the best adapted in the country to high speed and they are even predicting records will fall. Among those who were first to glide over the boards, several days in advance of real practice were Durant, Hearne and Pullen, who compose the Chevrolet Special team, Boyer, Sarles and Thomas in three of the Frontenac cars, Vail in his Philbrin which he has reconditioned after a recent accident at Ascot Park, Dutton in a Stutz and Klein in a Peugeot. Among the other early arrivals were Goodson, Murphy, Stein, Mulford, Milton and Nicholson.

Seemingly nothing has been overlooked in preparation for the race. The Speedway is a privately built and owned plant and one of the most magnificent in the country. There was no open sale of stock in the company and the owners are among the most prominent financiers in the city. Strange as it may seem in connection with enterprises of this sort nobody was called upon to make a subscription. The owners realize there is little likelihood of there being more than two races run here annually over their

ENTRIES FOR LOS ANGELES RACE

Driver	Car
Cliff Durant	Chevrolet
Eddie Hearne	Chevrolet
Eddie Pullen	Chevrolet
Ira Vail	Philbrin
Roscoe Sarles	Frontenac
Joe Boyer	Frontenac
Joe Thomas	Frontenac
Goodson	Frontenac
Tommy Milton	Duesenberg
Art Klein	Peugeot
Reeves Dutton	Stutz
Waldo Stein	Oldfield Special
Ralph Mulford	Meteor
Nicholson	Hudson
Ralph De Palma	Ballot
Brown	Richards Special
White	White
Eddie O'Donnell	Hudson
J. De Palma	Mercedes
Hill	Delage

track so they cannot have been actuated solely by the idea of gain.

The entire plant represents an expenditure of approximately \$500,000. There are two grandstands on opposite sides. Access to the enclosure is through tunnels. Pedestrian and motor traffic will not come in contact. Ample

provision has been made for the parking of cars and one of the most prominent features is the carefully rolled and graveled safety zone onto which cars may be driven if it becomes necessary to stop.

The electrical timing device that has been in use at the Indianapolis speedway will serve the same purpose here and be manned by the same crew. Officials of the A. A. A. contest board, led by Chairman Kennerdell, have promised to attend. There will be a great turnout of city and county officials and other dignitaries. The Motor Car Dealers Association members have agreed to close their places of business the day of the race.

DOZEN ENTRIES IN FOR GLIDDEN

New York, Feb. 18—More than a dozen automobile manufacturers have notified the American Automobile Association that they will enter stock cars in the National Reliability Tour for the Glidden Trophy, which will be run from New York to San Francisco, probably over the Lincoln Highway. Several others have promised to support the project.

The definite date for the start has not been set, but it is understood that it will be about Sept. 1. The entry blanks have been in circulation but a short time, and the contest board is well pleased with the early responses.

The committee in charge of the tour includes: R. Kennerdell, chairman; S. A. Miles, Alfred Reeves, Robert Wolfers, W. E. Metzger, C. G. Sinsabaugh and E. S. Hare.

Stars to Battle for the Title in This Year's Hoosier Race

INDIANAPOLIS, Feb. 18—The stars of the speed world will resume the battle for the national driving championship with the race on the new Los Angeles Speedway Feb. 21, and endeavor to lower the colors of Dario Resta, crowned "King" in 1916. This will be the first championship since the war. It is decided upon a point basis and the award is made by the A. A. A. Contest Board, the governing body of major league automobile racing. The rules governing the championship control the amount of prize money offered by setting a minimum per mile. It is also provided that the five leading drivers during the season must compete in a championship event. This will prevent a star from picking his favorite courses, unless he is below the fifth man at the time.

An honor which is held in even greater esteem than the championship medal is to win the Indianapolis 500-mile event. This will be a championship race and figure in the award, but the individual driver would gladly sell his championship chances if assured the Indianapolis victory.

There are several reasons for this attitude. The rich purse of \$50,000 is a

factor but not in the same proportion as the fame that goes to the victor, for the race is international in reputation as well as in name and has been won with a foreign car since 1912. Another reason for a driver to be envious of this claim to fame is that the victory is hard earned. Driving 500 miles on the bricks at Indianapolis is equivalent to 1000 miles on the average board speedway, because it takes driving skill and not brute strength to keep a car on the Indianapolis course. Winning where it is a battle of wits and competing with the best European drivers makes the Indianapolis event a choice plum. It is also noticeable that no man who has had skill, ability, or was in position when the opportunity offered to step out and win, has lost his life, the seven winners will not compete, but the five who are still active in racing will be present May 31.

The race itself will be watched with interest the world over. In this country it will be studied by engineers for it is the first major event in which the small engines of 183 cubic inches or under will compete. The speed this year will be a topic for many a "hot stove

league" when baseball "dope" pales, for it is not unlikely that the small cars will show almost as much speed as the big cars did on the bricks. However, this can only be proved after the race is run, but can be accurately gaged in the time trials, where the driver must do ten instead of the conventional two and one-half miles to qualify.

European engineers have long ago voiced the praises of the small high speed engine and the little engines have been tested and tried in events across the water. Europe will be interested in the race from this standpoint, as well as the performance of the cars it will send.

Because it is the longest race of the year on any track, which will conduct championship races under A. A. A. supervision, the Indianapolis winner is bound to be a factor and the points awarded will go a long way toward determining the victor. While Los Angeles started the title race, the real battle for leadership will not get under way until the starter drops the flag for the 33 drivers successful in getting a chance at the \$50,000 and a niche in the "speed" Hall of Fame, May 31.

TRUCK MEN TO ORGANIZE

Indianapolis, Feb. 15—The Motor Truck Owners of North America is an incipient organization with headquarters at Indianapolis. This is the outgrowth of the motor truck conferences at New York and Chicago shows. The national headquarters have been established in Indianapolis because of the motor truck development which has been done by the

How Denver Organized a Service Men's Association

DENVER, Feb. 14—Three months ago, shop and service station conditions in most of Denver's garages and agencies were in a deplorable condition.

Then Harrison Goldsmith, secretary and business manager of the Rocky Mountain Auto Trades Association stepped in and suggested to the service men and shop foreman that they get together for mutual benefits. A meeting of the men interested was called and a luncheon was staged at one of the leading hotels to help that get-together spirit along. A representative gathering resulted, and L. L. Perry, service manager of the R. R. Hall Cadillac Co., was elected chairman with H. W. Ludwig of the McFarlan Auto Co. as secretary.

It was decided to hold noonday meetings and luncheons on the second and fourth Wednesday of each month and a committee was appointed to make a list of subjects for discussion at these meetings. The subjects to be discussed were

along the lines best calculated to secure greater efficiency in the shop and service end of the business and it was decided from the start that no policy was to be adopted which would tend to conflict with the business policy of any of the firms whose service men or foremen were affiliated with the association.

The main object of the meetings is to produce better methods of service in the shop and to create a spirit of fellowship among the men engaged in the same line of work. At the various meetings two or more speakers, generally chosen from among the automobile dealers, are invited to make talks along service lines and very often suggestions are made which prove mutually beneficial to members of the association.

The Service Managers' Association is a sub-division of the Rocky Mountains' Trade Association which covers eight western states and efforts are being made to organize the service managers and shop foremen in the other cities of the association territory. At the present time, tentative organizations have been effected among service managers at Colorado Springs, Pueblo and Trinidad, Colo., and a meeting is to be called in the near future at Cheyenne and Casper, Wyo. Dealers at Salt Lake City also are interested in the movement and are getting together and soon there will be a meeting held in the Utah metropolis for the purpose of organizing the service managers and shop foremen of that city.

Townsend Bill Is Endorsed By Three Southern Bodies

NEW ORLEANS, LA., Feb. 17—The Townsend bill, now before congress, providing for a national system of highways, was unanimously endorsed by official representatives of the automobile bureau of the Association of Commerce, the Louisiana Motor League and the Kiwanis Club of New Orleans, at a recent luncheon held to give S. M. Williams, chairman of the Federal Highways Council, opportunity to speak in favor of the bill and to outline its provisions clearly. Duncan Buie, chief engineer of the state highway department, opposed the bill, declaring in a brief speech following Mr. Williams, that he believed that the matter should be "left to the nation's congressmen, who have all the data before them."

Inasmuch as the passage of the Townsend bill would eliminate the state highway department, or, at least, take it out of politics, Mr. Buie's argument did not carry as much weight as it otherwise might have done. Walter Parker, manager of the Association of Commerce, furthermore, followed Mr. Buie with the announcement that the Mississippi Valley Association had gone on record as

Indianapolis Chamber of Commerce, after it was relinquished by the state council of defense during the war period. Tom Snyder, assistant secretary of the Indianapolis Chamber of Commerce, has been invited to become the executive secretary of the new organization, which starts with the idea of publishing a magazine devoted to the education of the motor truckman as to the care and business of owning a truck.

endorsing the Townsend bill. Ginder Abbott, of the Abbott Automobile Company, presided at the luncheon, which was attended by a large number of leading business and professional men of New Orleans.

FRANCE TO RACE SMALL CARS

Paris, Jan. 23—With a total cylinder area of only 85 cu. in., an international light car race will be held near the town of Le Mans on Aug. 29. This race, which will be open to all but the late enemy subjects, will be for a distance of about 250 miles. It is the smallest car race ever held in France.

SOUTHERN EQUIPMENT DEALERS TO MEET

Birmingham, Ala., Feb. 14—The Southern Automotive Equipment Dealers' Association will meet February 19, 20 and 21 in this city at the Tutwiler hotel. The meeting will be attended by the following officers of the Automotive Equipment Association: President, R. R. Englehart; vice-chairman of the board, L. P. Halladay; and Commissioner William M. Webster.

DUESENBERG POSTPONES SPEED TRIALS

Elizabeth, N. J., Feb. 14—Temporary abandonment of the Duesenberg attempt to lower world's speed records at Daytona Beach was forced because of bad weather conditions in Florida. A Duesenberg Special, to be driven by Tommy Milton, was scheduled to go after the records now held by De Palma and the Packard and the car was shipped as far as Jacksonville. Bad weather, however, precluded trials at present and the car was diverted to California where it will be used in the races on the Beverly Hills track.

BUFFALO GETS ANOTHER RUBBER PLANT

Buffalo, Feb. 16—Closely following the announcement of the Dunlop interests that they would build their proposed American tire plant in Buffalo came an announcement that the Pennsylvania Rubber Co. will soon begin the erection of a rubber plant within a mile of the Dunlop factory site. The Pennsylvania company, which has plants at Philadelphia and Akron, will use its proposed Buffalo factory for rubber reclaiming. A 97-acre tract adjoining the Niagara River near the Dunlop plant has been purchased and work on a factory begun

Many Measures to Affect Cars Are Offered in Massachusetts

BOSTON, Feb. 17—More than forty measures affecting motor vehicles and dealers in various ways have been submitted to the Massachusetts legislature, for consideration this year, on which hearings have been started. Last week the Roads and Bridges committee met and heard several bills. One of these proposed that every man who did a repair business should have to pass an examination as to his skill; and on top of that the Public Works Department was to find out about his honesty, and the fairness of his charge for different jobs. The motorists attacked it, but the finishing touches to it were given by Public Works Commissioner Cole, who pointed out that it would be absolutely impossible to investigate the fairness of a man's bills, his honesty, etc., and that it would cost the state \$500,000 at least to build up a force of detectives who would have to rival Sherlock Holmes.

Another bill sought to give a definition of the law of the road so that vehicles coming from the right would have the right-of-way over other vehicles. A clause giving street rail-ways the right-of-way over everything else was opposed, so this will be deleted. A

third bill called for the distribution of number plates by cities and towns.

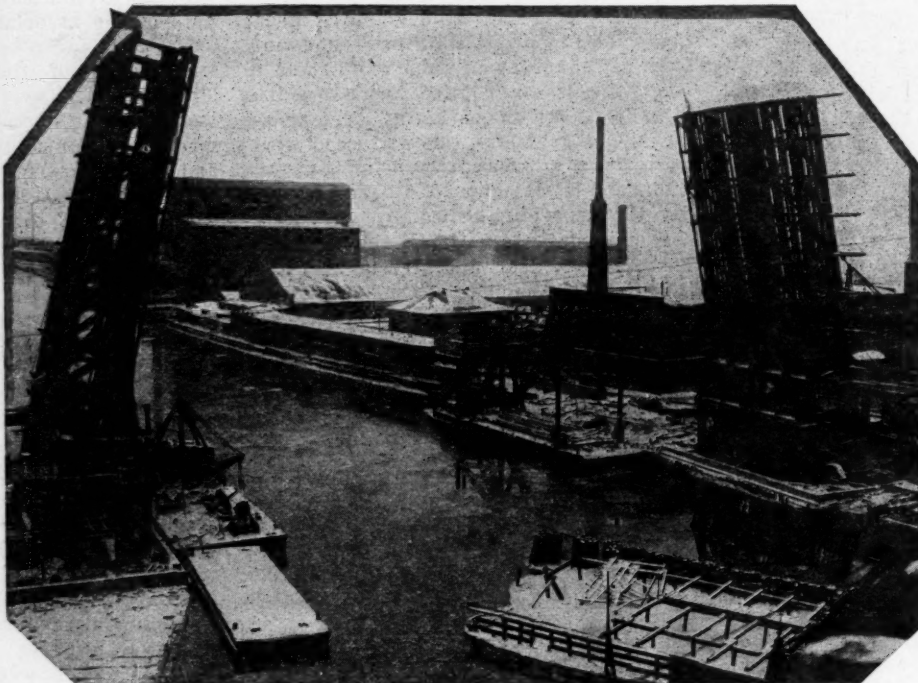
More drastic bills are to be heard later. One provides that no person shall operate a motor vehicle on the highways without first taking out a bond for \$5,000, or if he cannot get a surety company to bond him he will have to get unencumbered real estate valued at \$10,000, or put up a cash deposit of \$5,000. The insurance commissioner has put that bill in, and it will be hard fought. There are two insurance bills to arrange that motorists may take out a form of insurance somewhat similar to the workmen's compensation act.

Under another petition all tank wagons carrying gasoline, benzine, and such oils will not be allowed to go through the

streets between the hours of 7 a. m. and 8 p. m. This would mean the filling of all gasoline stations at night. The garage men will attack it.

Another provides that the height of all loads shall be restricted to 11 feet. At present there is no restriction. The 11 feet limit would rule off the streets the trucks used by box, barrel, wool, furniture and such firms. This bill also seeks to include within the provision of the 28 feet over all load horse-drawn vehicles. So there will be big opposition to it.

Link Bridge Nears Completion



If you ever tried to get across the Rush street bridge in Chicago during rush hours, you would know what this new bridge spanning the Chicago river means. It is rapidly nearing completion and probably will be thrown open for traffic in early summer, so some of the traffic trouble will be over. The bridge, which links the north and south side boulevard systems, is a double-deck affair with one level for heavy traffic and the other for automobiles

There is a bill providing a penalty for throwing glass, tacks, etc., on the highways. This will be favored by the motorists. A year ago the Bay State Automobile association sent out a truck which gathered up several hundred pounds of glass in one week in Boston alone.

A measure to relocate and straighten out the cuts under railroads and make them deeper will also be favored. So will one to allow motorists in Boston owning their own homes to erect steel garages for their cars on their own land without a lot of red tape. Another bill proposes to allow two towns to hire a man as supervisor of highways for the two places, to build and maintain the roads, the cost to be divided.

DUPONT MAY QUIT WILMINGTON

Wilmington, Del., Feb. 17—In view of the fact that the duPont Motors Corp., which has just perfected a new car, as heretofore announced, is about ready to start building it, and, being unable to obtain help or housing facilities for help here, it may be necessary to find another location. In fact, according to E. Paul duPont, president of the company, it has been practically decided to go elsewhere. The company wants to be as near Wilmington as possible, however, and is likely to locate between Wilmington and Philadelphia. One site, which is regarded with favor, though has not been definitely decided upon, is at Moore, Pa., about sixteen miles north of Wilmington.

The company has built its show cars and done all of the experimenting at the plant of the Delaware Marine Motors Co. here and would enlarge that plant and build the cars there were it possible to obtain help which might be brought here. This seems impossible, hence the necessity for looking elsewhere. The Chamber of Commerce has taken the matter up and, if possible, will try to keep the company here, though now this looks like a hopeless task.

The new duPont car, the product of the company, was first exhibited at the New York show, and during the current week at the Wilmington show, and at both it made a favorable impression on the public. It appears to have a future.

PHILADELPHIA DRIVEAWAYS

Philadelphia, Feb. 17—The car shortage is proving a hardship to various automobile dealers here. Several companies are having to resort again almost entirely to driveaways in order to obtain deliveries. This failure of replacement of damaged and outwork rolling stock on the part of the railroads is all the more emphasized now, because of the speeding up of automobile turnovers being accomplished. Freight is piling up in terminals waiting for shipment and many shippers of miscellaneous freight are relying on motor trucks for less than carload lots.

Officials of the local Cadillac agency state that because they were unable to obtain box cars, they have had to send ten men to Detroit, who must plow their way through the snow on the return trip under automobile power. Other concerns have had to use the same expedient, regardless of the bad and, in many places, almost impassable condition of the roads since the big storm. In such cases the expense is heavy. The men who run the cars must be taken off other work, when workmen can ill be spared; the machines must be provided with skid chains and two or three days on such trips are hard on tires.

TO ORGANIZE USED TRUCK EXCHANGE

Cincinnati, O., Feb. 14—A used truck exchange, through which all sales of second-hand motor trucks would be made, is likely to be established by the Cincinnati Motor Truck Dealers' Association, at a meeting at which promises of financial aid were made by prominent members. The exchange probably would be incorporated, with the dealers as stockholders.

The plan of organization includes the engagement of a manager to appraise all trucks for which a "trade-in" is sought and to place fair prices on them. His decision would be final. In this way it is hoped to abolish the "trade-in" evil. Reasons are found for this step on the part of dealers in the fact that business men and others are said to be securing used trucks at a low price, then trading them at a much higher valuation for new ones.

PIPE GAS FROM HAVRE TO PARIS

Paris, Feb. 2—Owing to the urgency of getting fuel oil and gasoline supplies to Paris, orders have been given for work to start immediately on the construction of the 130 miles pipe line from Havre to Paris.

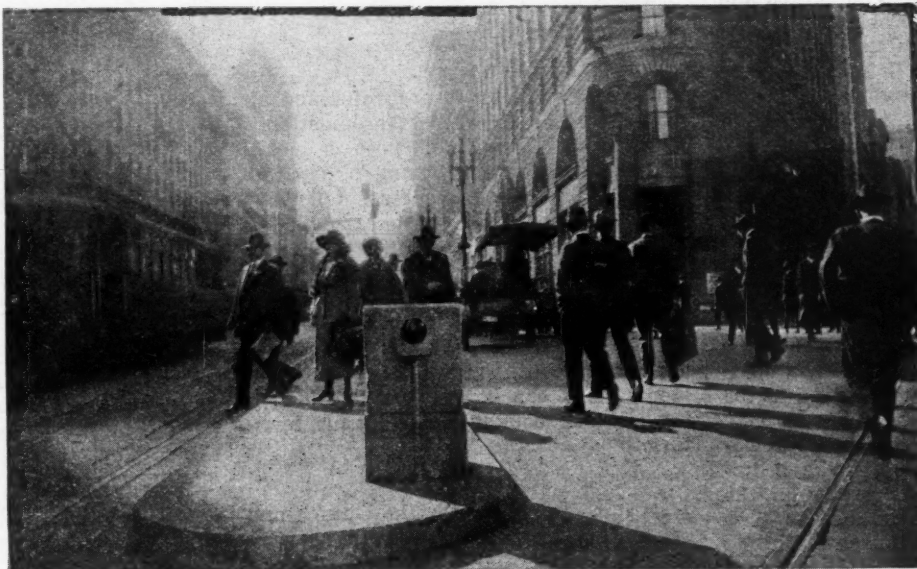
This work, which will cost \$18,000,000, comprises a special dock at Havre and a 10-in. fuel oil pipe with five pumping and heating stations, the whole capable of delivering 4500 tons of oil per day. Above this line there will be a second pipe of 4 in. diameter for carrying kerosene. This will have an output of 1000 tons per day. The line will follow the route of the main road from Havre to Paris, passing through Bolbec, Yvetot, Barentin, Rouen, Pontoise. This work

Californians Protest Against Discontinuance of Distillate

LOS ANGELES, Feb. 16—The recently announced decision of the Standard Oil Co. of California to discontinue the manufacture and sale of engine distillate has created a storm of protest from all parts of the Pacific coast. However, the decision apparently is final and there is not much probability the protests will accomplish anything, although a governmental investigation has been promised by Attorney General Palmer. The action is said by oil company officials to have been necessitated by the reduced supply of crude oil from which distillate

arrangement to preheat the distillate to render it more volatile. These trucks have been sold largely on the strength of this equipment and the fact that cheap fuels could be burned successfully. Other truck dealers and thousands of operators have not taken up the use of distillate despite its low cost because of the large amount of carbon found in burning it. Many owners have preferred to pay the additional cost of gasoline saying it was offset by the lack of frequency with which it was necessary to remove the carbon.

Safety First,—At Night



San Francisco has adopted the plan of equipping its safety island with electric lights which are easily discernible at night and it is said as a result collisions with these islands by motor cars have been considerably reduced in number

was made and the enormous increase in the demand for gasoline. Distillate was a by-product in the manufacture of gasoline and to increase the supply of the latter the oil is being "cracked" in refining to such a point that no distillate is produced.

The Union Oil Co. and some of the smaller refineries have not stopped making distillate at this time but probably will later. The Union Oil Co. is said to be under contract to furnish distillate for at least another entire year. At this time, however, the demand for Union distillate is exceeding the supply.

Motor trucks, river and ocean going vessels, tractors and hundreds of thousands of passenger cars have been operating on distillate as a fuel. Some trucks have been equipped with a special stove

is being done by a private concern under authority from the French Ministry of Public Works; although the scheme has not yet been fully approved authority has been given to start work without delay.

less costly than gasoline is furnished them. It is estimated that 25,000,000 gallons of distillate are used annually by operators of fishing boats on this coast.

Tractor operators say that comparatively few of the machines now in use on this coast will burn kerosene successfully. Kerosene is the only remaining cheap fuel. Gasoline engines can burn kerosene, if sufficiently pre-heated, but not very satisfactorily, it is said. All gasoline engines, however, could burn distillate fairly successfully. The claim is made that the quality of gasoline recently has been so poor that it was scarcely different from distillate but this is approaching the exaggerated viewpoint.

Millions of gallons of distillate have been used annually on this coast for purposes other than fuel. There is not a garage or shop that has not been accustomed to use distillate for cleansing parts and washing motors. Even the housewife has been accustomed to have a can of distillate on hand for use as a cleanser for around the home.

From tractor and boat operators, more than from owners of cars and trucks is coming the protest against the removal of distillate from the market. Many of these claim they cannot afford to operate on gasoline and kerosene, another substitute is not acceptable. It even has been said that the operators of boats engaged in the fishing trade at Seattle, San Francisco, Los Angeles and almost all other points along the coast will have to suspend use of their vessels unless some fuel

2622 Jobs Without a Complaint

(Continued from Page 11)

tant and care should be taken so that the customer is not charged twice for the same work, which, in combination with other operations, is only done once. A sure guard against such mistakes is to make a flat-rate card for a complete overhauling of each unit, then graduate the price on each card on which one operation at a time is eliminated. For those who have not tried the flat-rate plan, start now to estimate a few operations daily and it will not take long before you will ask yourself how you could have gone on so long without it.

Promise As to Time of Delivery

After the price has been submitted and agreed upon, the next problem that confronts the service department is when the job will be ready. Before you make a promise always remember that when a promise is given it is not a mere scrap of paper that can be thrown away and forgotten, but it is a moral obligation that should be kept. First, be sure that the parts are in stock. Do not take a car in and do not make a promise unless this fact is known, and even if everything necessary is on hand, it would be better to tell the customer that the job will be done as quickly as possible, but should he insist, get the opinion of the shop superintendent as to the time necessary to do the job, and add, as a final precaution, that should something come up that would make it impossible to have the car ready on the date stated, he will be notified in time to make different arrangements, but do not forget to notify him. If a promise has been made, have this appear on the order so that different departments may govern themselves accordingly. Another method to remind the shop of a promise is to have different colored pasters attached to the windshield. Each day of the week is represented by a letter on a different colored paster.

Signing of the Order

After all the arrangements have been made, the order should be signed. This is very important and should never be neglected. If the owner is represented by his chauffeur it would be advisable before proceeding with the work to call up the owner, giving him a description of the work which the chauffeur has ordered, and if he accepts, it is fairly safe to begin work on the car, as very few owners will deny an O. K., even if it is given over the telephone. This will eliminate the dissatisfaction caused by waiting for the owner's authorization in writing. The orders are shown in Figs. 1, 2, 4 and 5.

Checking Up Personal Property

As the actual routing of the repair job has now started, an identification slip should be attached to the car and a stub

given to the customer. While the order is being sent through for further recording this will be the time to have the personal property removed and checked, always remembering to have the customer verify as to the correctness of the property removed by signing a slip which should be filed in the check room. In some smaller service departments, where only a few cars are being repaired, the cars are sent to the shop without removing any of the customer's tools or other property. This practice may be found all right where all cars are under the constant watch of the shop foreman, but in larger establishments it would not be advisable, as the customer's tools have a mysterious way of disappearing.

Recording the Job

For the sake of future reference all jobs should be recorded. The most suitable method for such purpose is a card system; each owner having a separate card, giving name, address, telephone number, date of sale, also car number, etc. One of these is shown in Fig. 8. Upon this card should be entered the number of each repair order, also the date the job was taken in. Such card system will greatly assist the service department with regards to encroachments, as it can be easily determined if the car was bought in an outside territory.

Typewritten Orders

As it is necessary for the service and accounting department, also the shop, to have a record of the job, copies should be made from the original order. In garages and smaller service stations orders are sometimes written in long-hand. One or two carbon copies, in addition to the shop copy, is all their records require. In large service stations, especially if the shop is divided into various departments, a larger number of copies is found necessary, for instead of writing a separate order for each department that is to work on the car, it is much easier to insert a sufficient number of thin second sheets when the order is written. The best machine for this kind of work is a large flat billing machine.

Routing System

The car is now ready to be sent to the shop, but before doing so a celluloid envelope containing the various shop copies should be hung on the car. Some arrangements should also be made that will keep the service floor posted and enable them at all times to know what is being done to the car. Various routing systems have been devised for this purpose. Some consist of cards kept in alphabetical order so that when a customer calls up all the necessary information is available. The information

clerk should, of course, receive such information from the shop at least twice a day. There should also be telephone service between the shop and the information office. Of late the routing board has come into use and in many instances is replacing the card system. This is shown in Fig. 7. This board is usually divided into spaces representing each working day of the week, or thirty-one spaces, one for each day of the month. The advantage of the routing board over the card system is that it will always attract attention, and as the information clerk arrives at his desk every morning he can easily see what jobs are promised for that and the following days. The general working principle of a routing board in a service station is as follows: After the order has been typewritten, the shop copies, together with a routing stub, are placed in the celluloid envelope which is attached to the car. Another copy of the order, together with the other half of the routing stub, is sent to the service floor routing clerk, or information office. A copy of the order is placed in a suitable folder and filed alphabetically, while the routing stub is placed on the routing board in the column under the day the car is expected to be ready for delivery. It should always be remembered that the most simple system of routing is apt to be the most successful.

(To be continued next week)

In the preceding story we have followed the car from the time it entered the shop until the trouble was diagnosed and the repair order written. The car is now ready to go into the shop and next week will be explained the system Mr. Holt has used so successfully in the shop.

ACCESSORY FIRM TO EXPAND

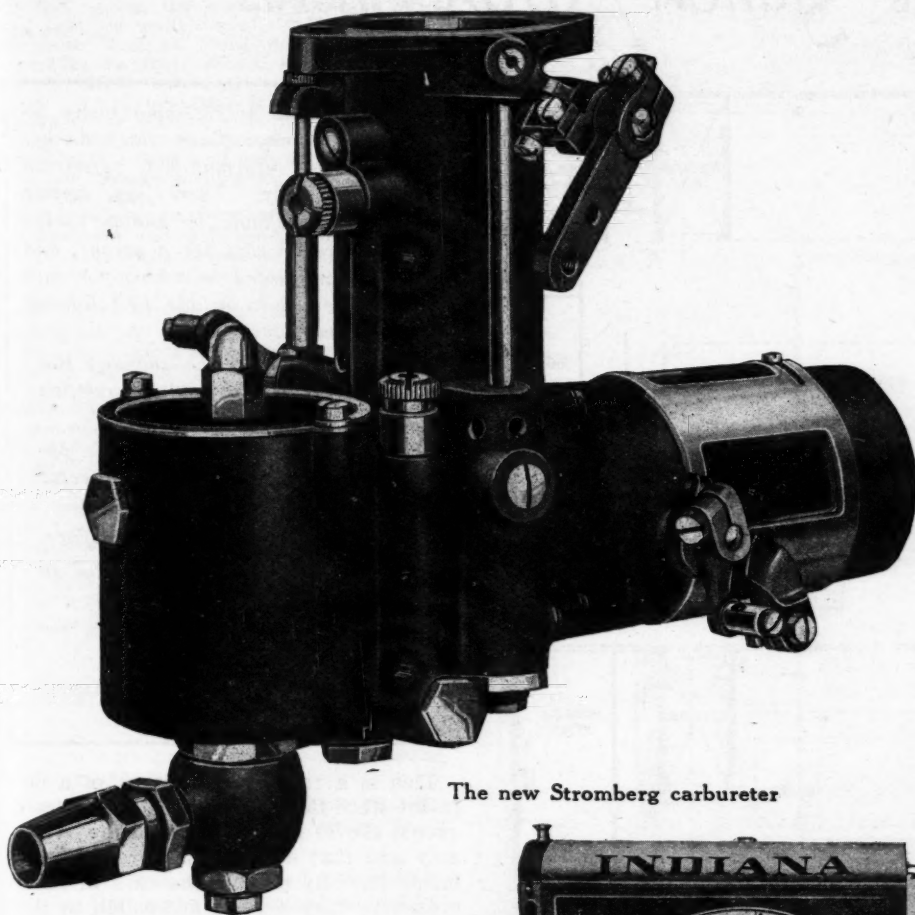
Indianapolis, Ind., Feb. 15—William T. Kincaid, who has been general manager of the Citizens Auto Supply Co., accessory dealers, has obtained the controlling interest of that organization and incorporated it with a capital of \$100,000, with the idea of expanding the business so that it takes in a series of stores in the larger cities of Indiana, such as Ft. Wayne, Richmond, Anderson, Marion, Muncie, Lafayette, Terre Haute, South Bend, and several others. The company has been established a little more than three years and under the management of Mr. Kincaid has built up an aggressive wholesale and retail business.

HORSEPOWER OF LAFAYETTE CAR

Rather ambiguous literature describing the new Lafayette car caused Motor AGE to publish in the specification table which accompanied its description of the car the statement that the engine develops 95 hp. at 4000 r.p.m. The maximum horsepower, of course, is developed at a much slower speed than the maximum revolutions per minute.

New Stromberg Carbureter Designed for Low Grade Fuel

One of the Features Is an Economizer That Supplies a Lean Mixture for Normal Speeds



The new Stromberg carbureter

STROMBERG for 1920 enters the low grade fuel field with a splash, by introducing a new plain tube carbureter. This model was designed to overcome all the inherent difficulties of low grade fuel carburetion.

The chief points in the design of the carbureter are: A fuel feed above the throttle that supplies just enough fuel through an adjustable screw for idling speeds, and accelerating well which gives an extra supply of fuel at the moment of speeding up; and an economizer that supplies a very lean mixture when driving under normal and light load conditions, but which automatically supplies a rich mixture when the full power of the engine is needed.

Parker Rear Axle

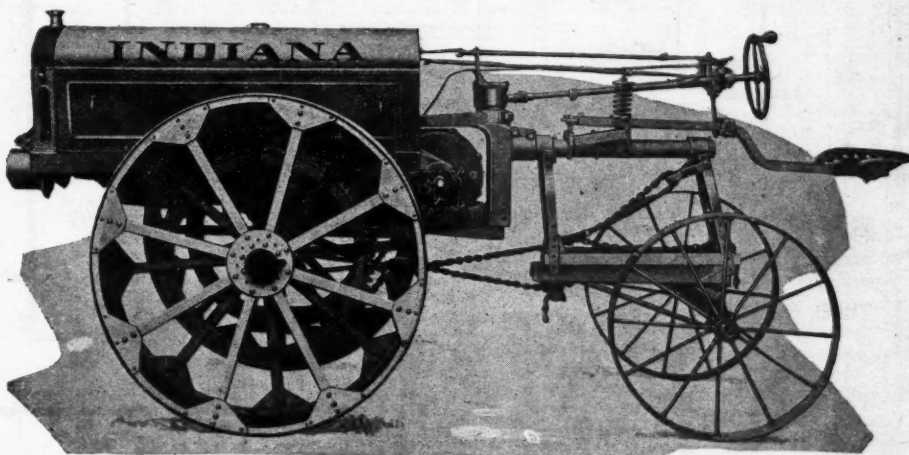
The Parker Axle & Products Corp., New York, has brought out an improved truck axle of the internal gear-driven type. This new axle has a perfected multi-disk make, completely inclosed within the axle and operating in an oil bath. The action of this brake is positive under all conditions. It grips instantly but without shock or grab. The brake units are easily accessible and may be renewed in less time than is required for the renewal of a band type

of brake, should unusual conditions make this necessary. Replacement of friction surfaces requires no riveting. Each brake unit is self-contained and easily removed from the front of the axle. The brake adjustment is outside of the axle, perfectly visible and accessible. The toggle mechanism provides an automatic equalizer.

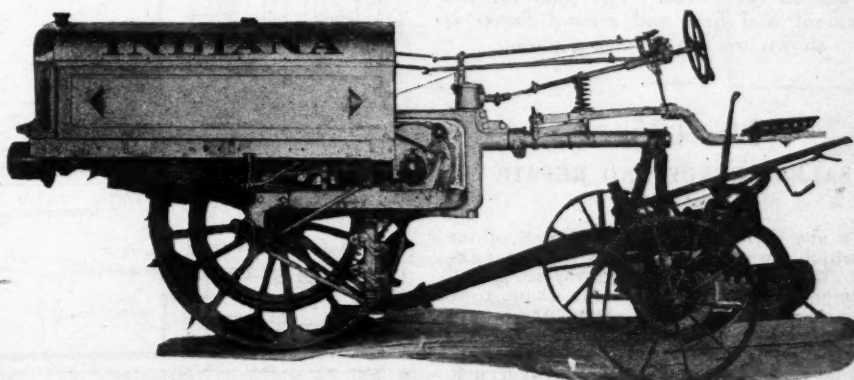
All-purpose Tractor

The Indiana Silo & Tractor Co., Anderson, Ind., is preparing for a vigorous sales campaign on the Indiana tractor this coming year. Connections have been made in the west, south and in New England on the distributor basis, while the company will dispose of the tractor through its own sales organization in the corn belt. Materials have been bought for several thousands of machines and a specially designed plow will be sold as a unit with the tractor.

The Indiana, as is indicated by the illustrations herewith, is of the general purpose, 2-wheel type and can be used by the farmer for all 2-horse work. It pulls two 12-in. bottoms or one 16-in. It will cultivate row crops and will do any work on the farm which ordinarily requires one team of horses.



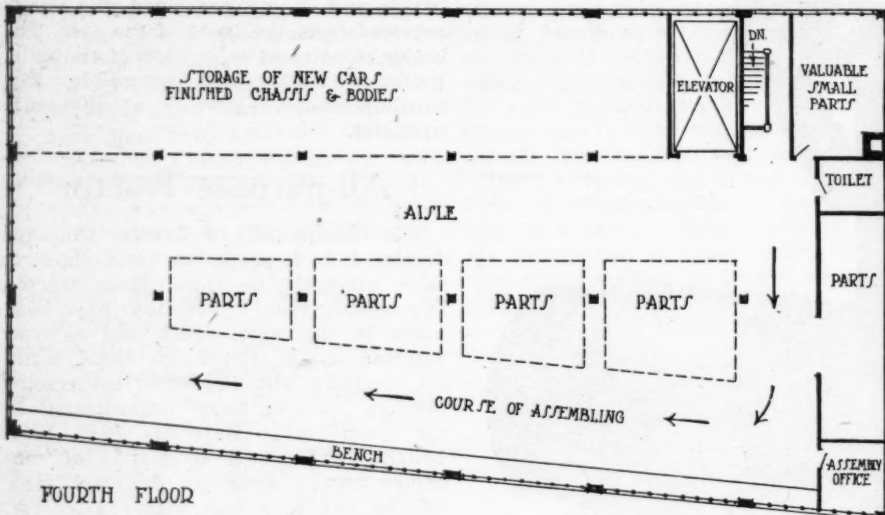
Indiana small general purpose tractor which is a one-man machine



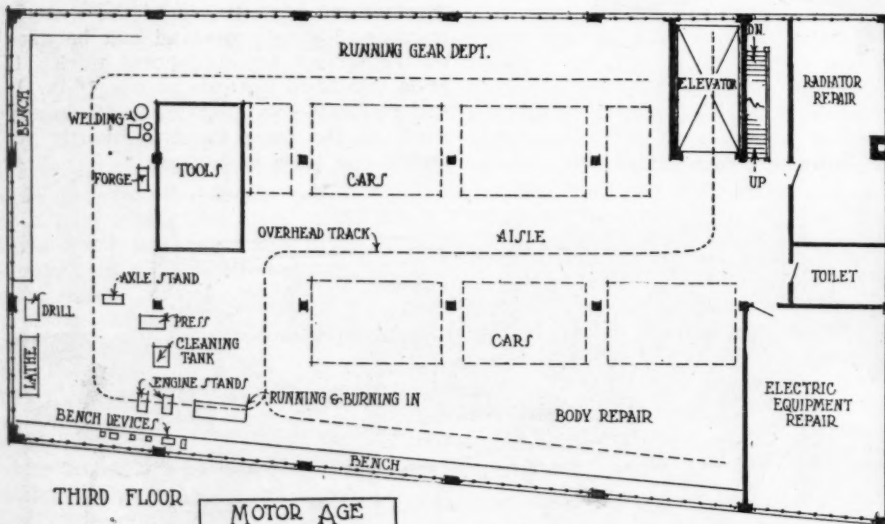
Side view with one drive wheel removed to show final drive

Garage Planning

Service Station Arrangements



FOURTH FLOOR



THIRD FLOOR

MOTOR AGE
GARAGE PLAN 186
for CHAS. G. HANNACO
SYRACUSE N.Y.

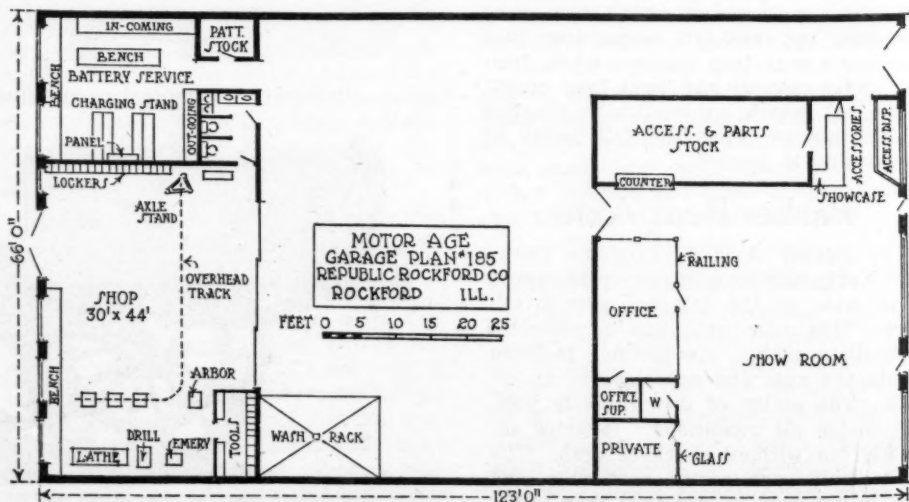
FEET 0 5 10 20 30

No. 186—Above is the plan for the third and fourth floors for large sales and service station for Fords. The plan for the basement and first and second floors is shown on the following page

No. 185

SALES AGENCY AND REPAIR STATION

We are inclosing a rough sketch of lot on which we are planning to build a garage. We want to operate a car sales department with show space for about four cars, a small accessory store, and parts room of fairly good size. Expect to employ about six men in our shop, also battery service.—Republic Rockford Truck Co., Rockford, Ill.



MOTOR AGE
GARAGE PLAN 185
REPUBLIC ROCKFORD CO
ROCKFORD ILL.

FEET 0 5 10 15 20 25

No. 185—Sales agency and repair station

MOTOR AGE is receiving many inquiries for garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage, and inquiries are urged in asking for such plans to be sure to include the following information.

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

This is a rather good layout of a 66-ft. lot since there is practically no waste except the 10 ft. strip used in the driveway and that is a necessary evil on an inside lot. By placing the cars in rows crosswise they are all accessible to the aisle.

The parts stockroom is combined with the accessory room to save labor and put all stock in control of one person. It may seem too small to meet your requirements but if good judgment is used in constructing bins and racks much can be put in small space. The room could be enlarged only at the expense of the showroom which is now too large for four cars as it is.

No. 186

FORD SALES AND SERVICE STATION

We have just purchased what we consider an ideal spot for a model motor service and sales building, having streets on three sides and a beautiful park in front. Also it is on the main street that runs east and west not only through the city but across the state. We have figured that we want our showroom to face the park, and as Ford dealers seldom have cars on their floors, I believe that 35 ft. by 63 ft. would give sufficient show space. We figure that if we give Ford owners good service that the sales will almost take care of themselves. We need two private offices and one small reading room for keeper, cashier and clerks about twice this size.

We do a very large parts and accessories business and will need 1700x1800 sq. ft. for this department, with a surplus stock room of about the same size, either on the second floor or in the basement. The balance of the first floor would be given over to quick service jobs and service manager's office.

On the second floor we are planning on a used-car department and commercial display. In the winter we have on hand as many as twenty or twenty-five used cars and display seven or eight types of commercial cars. We do not want any monthly storage customers.

On the third floor would be our repair shop, tool crib, machine shop (including burning in machinery, motor overhaul, etc.) and other subdepartments incidental to a first class Ford service station.

The fourth floor would be given over to assembling new cars and getting them ready for the owner's hands. We employ four to six men in the assembling department, and twenty to thirty in the repair shop. We have about decided on concrete and as much glass as possible with steel sash, but finished in keeping with the surroundings.—Chas. G. Hanna Co., Syracuse, N. Y.

This plan has been worked out in about the manner you requested. The only change we would suggest would be the transposition of the third and fourth floors so that more light might be had in the repair shop by the use of skylights. You have made no disposition of the basement and it is our opinion that it would be better to make no definite or permanent use of this space; keeping it for the storage of overflow stock of new or used cars which would not be kept any great length of time and consequently not suffer from the dampness that pervades all basements, especially in summer weather. Above all do not keep in the basement parts and accessories which might be in stock for a long time and become unsalable from rust or mildew.

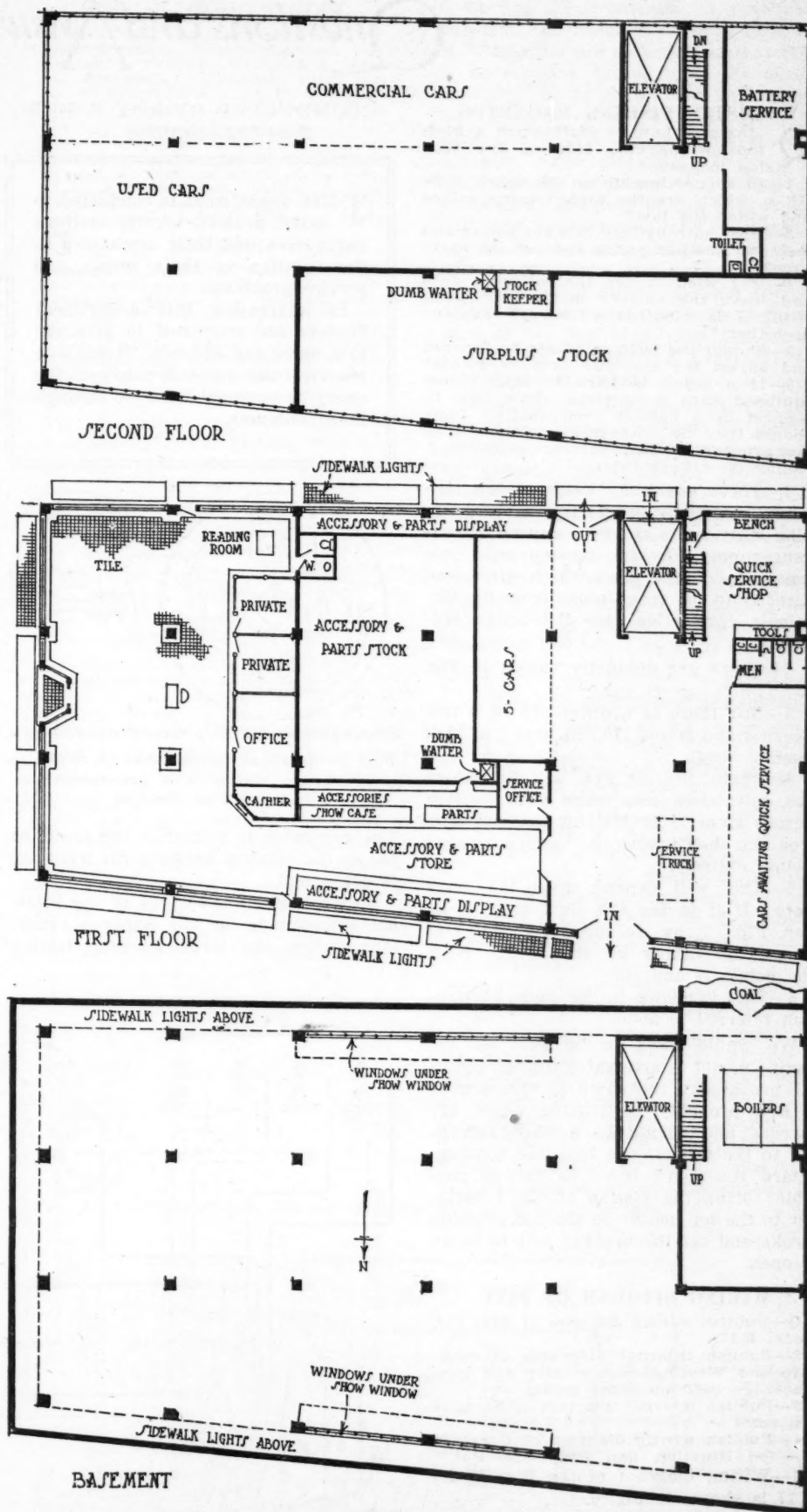
The parts and accessory stocks on the first and second floor are in communication through a dumbwaiter and it might be well to continue it up to the third and fourth floors so that parts could be delivered direct to the shop and assembly floor. The elevator is placed so that it can be entered or left from within or without with no turn necessary.

In the shop cars are lined up in two rows and placed according to the work to be done on them. Miscellaneous and running gear jobs are at one side, body work at the other and power plant work at the end of the room. An overhead conveyor leads to all parts of the floor, up and down each side and through the center aisle.

There is also a spar running on the elevation so that heavy parts may be picked up and moved around the shop.

On the assembly floor stocks of parts are placed in piles or inclosed in rooms

along the north central part of the room and cars are assembled as they are pushed along the aisle between the stock piles and the windows as indicated on the plan.



No. 186 (continued)—Here is the plan for basement, and first and second floors. The plan for the third and fourth floors are carried on the preceding page

The Readers' Clearing House

Questions and Answers

DISTINGUISHING MAGNETOS

Q—Instruct how to distinguish a high tension magneto from a low tension magneto?

2—In connecting up an Eisemann type GR-4, which are the high tension cables and which the low?

3—Must both battery breaker points and magneto breaker points open at the same time?

4—If I wish to use the magneto only and leave the battery in the car, what should I do with battery wires? Disconnect them?

5—Should the battery points be ignored and adjust the magneto breaker points?

6—If a truck is hard to start when equipped with a magneto, show how to connect up a battery temporarily? How should they be connected with any type magneto on a Garford truck.—Phillip J. Kenny, New York City.

1—There are many kinds of low tension magnetos. Ordinarily the low tension magneto is simply a source of current supply. A high tension as a rule has a distributor, from which wires lead directly to the spark plugs from the terminals connecting the distributor segments.

2—These are distinctly shown in Fig. 2.

3—No; there is a difference of a few degrees, an about 10, to avoid a kick back.

4—Again consult Fig. 2. Disconnect the coil wires and make a connection across from H to HM on the magneto. You can then ignore the battery breaker points entirely.

5—This will depend upon the magneto. If it is the GR then arrange as per Fig. 2 by reconnecting the coil wires and taking off the bridge from the points H and HM.

6—This is shown in the same illustration referred to above.

We would have to be sure as the engine model to give valve timing, but in all probability the flywheel is marked; if not, probably the timing gears are marked and should be meshed according to the marks. To time the ignition, retard the spark lever as far as possible; bring the piston of No. 1 cylinder to the top center on the compression stroke and set the breaker just to begin to open.

WIRING DIAGRAM OF FIAT

Q—Publish wiring diagram of Fiat car, model E 17.

2—Publish internal diagrams of magneto and Westinghouse starter and generator as used on same model.

3—Publish internal diagram of Sprague generator.

4—Publish wiring diagram of Overland 69.—Joe Hinville, San Francisco, Cal.

1—Wiring diagram of the Fiat Model E 17 is shown in Fig. 6.

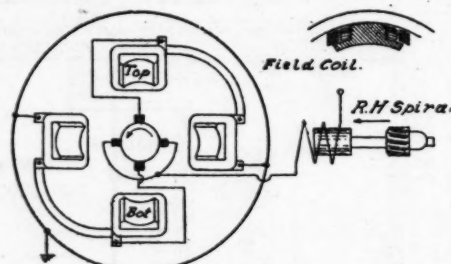
2—The internal diagram of the Westinghouse starting motor shown in Fig. 1, is of the type used on the F.I.A.T.

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age

THIS department is conducted to assist dealers, service stations garagemen and their mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Motor Age reserves the right to answer the query by personal letter or through these columns.



Westinghouse Starting Motor Fr. Nos 700-750.

Fig. 1—Internal connections of Westinghouse starter and generator as used on the Fiat

The generator is primarily the same, as far as the relation between the windings is concerned.

3—We have no diagrams of the internal connections on any Sprague generator except the large Sprague testing

dynamometer. It is believed that this is diagram you wish.

4—The wiring diagram on the 1913 Overland 69, which was equipped with the U.S.L. system is shown in Fig. 5.

QUESTIONS ON ELECTRIC CURRENT

Q—What are the advantages and disadvantages of direct and alternating currents? Which do you consider better?

2—What is meant by k.-w. in calculating electrical currents?

3—How is the city current registered by meters and what is the usual cost and consumption of current per lamp?—Frank A. Pelican, Hillhead, S. Dak.

1—Alternating current has the advantage over direct current in that it is extremely flexible. It can be stepped up or down at will. It can be transmitted over long distances with comparatively small losses. It is cheaper to produce in large quantities, and this is particularly important when large central stations have to purchase coal to make the current with.

Direct current has the advantage that it is unidirectional in its flow at all times. This makes it valuable for certain kinds of work where direct current is indispensable, as for example in telephone application where the coils of the relays would hum loudly with alternating current. For charging batteries direct current is ideal. In Europe, direct current is used very extensively. Its use though, in large quantities creates operating difficulties that are not very easily or inexpensively met.

To illustrate this last statement: One large city is furnished with direct cur-

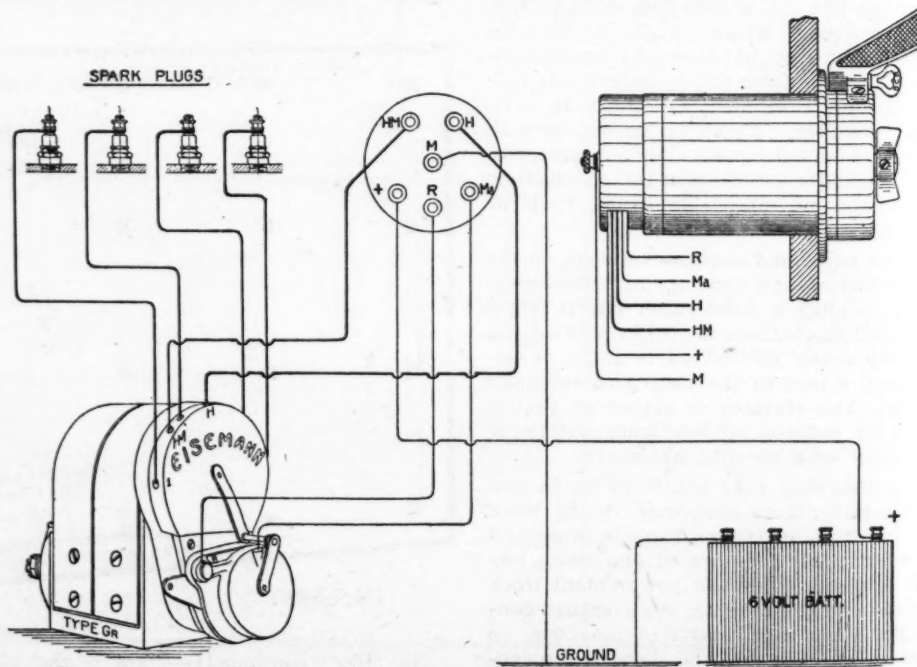


Fig. 2—Connections of Eisemann high tension magneto

rent by a submarine cable and the sea is used for the return circuit. This part of it is all right. But, the high tension direct current makes it necessary to use large porcelain insulators on the bottom of all motors, using the high voltage current. Whenever it becomes necessary to use a lower voltage a motor generator set must be used and since it would be too expensive to wind the motor for the high voltage current the motor is merely connected in series with the line. The voltage difference on the machine then is that only of the drop across the coils. There is a large potential difference between the base of the machine and the ground, hence the reason for the porcelain base on the machine. Whenever a machine is to be cut out from the line, it can not be disconnected, but must be short circuited out. That is, a shunt switch is placed around the machine that by-passes the current around the motor.

In this country the trend is toward the more flexible alternating current. We believe that at this time there is no direct current generated in the city of Chicago by the central stations. All the current is produced by alternators and wherever direct current is required, as for street car purposes, the alternating current is put through a converter.

2—A kilowatt is 1000 watts and the watt is unit of electrical power; 746 watts are the equivalent of 1 hp. The watts used in a circuit can be calculated by multiplying the volts by the amperes. This is for direct current only. For alternating current the same is true, but the question of power factor enters in where an inductive circuit is used.

3—The city current, as you term it, is measured by what amounts to a small motor, which is placed in series with the load. When the lights in a house are turned on the current flows through the motor and so turns the hands of the dial. The cost of current in Chicago is about 9 cents per kilowatt. In many other cities, though, this rate is higher. A 40 watt lamp means that in one hour's use 40 watt hours of current will be used. In other words, this lamp will have to run about 25 hours before the cost will be 9 cents.

WIRING OF SIMMS MAGNETO

Q—Publish wiring diagram for Simms duplex S. U. 4 system.

2—Is a coil necessary for this system? What type?

3—Explain how to change rotation of this magneto from clock wise to anti-clockwise.—E. Johnson, Kansas City, Mo.

1—The diagram for the connections of S. U. 4 Simms magneto, of clockwise rotation is shown in Fig. 3.

2—No coil is necessary for this magneto, it being a straight high tension magneto.

3—Simms magnetos are made to run in one direction only, as is shown by the engraved arrow on the cap of the distributor.

WIRING DIAGRAM OF CHEVROLET

Q—Publish wiring diagram of 1916 Chevrolet, model 490, and advise best timing for track work for this engine.—J. F. Weathered, El Paso, Texas.

To assist readers in obtaining as a unit all information on a certain subject MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

THE ELECTRIC SYSTEM

Philip J. Kenny.....New York City
Joe Hinville.....San Francisco, Cal.
Frank A. Pellican.....Hillhead, S. Dak.
E. Johnson.....Kansas City, Mo.
J. F. Weathered.....El Paso, Texas
Davis Garage.....Neshboro, Wis.

MISCELLANEOUS

Frank A. Pellican.....Hillhead, S. Dak.
Frank A. Pellican.....Hillhead, S. Dak.
John P. Schwarz.....Miller, S. Dak.
J. Stanley Ford.....Findlay, Ill.
Charles M. Dawson.....Piketon, Ohio

ENGINES

Overne J. Summers.....Memphis, Tenn.
E. Christensen.....Tacoma, Wash.
Lockhart Bros.....DeGraff, Ohio
Henry G. Dollman.....Indianapolis, Ind.
Harry E. McKee.....Jefferson, Ore.
Frank McCutchen.....Chicago
Proctor-Smith Motor Co.....Mena, Ark.
Frank A. Pellican.....Hillhead, S. Dak.

Fig. 4 shows the Auto-Lite single, or grounded return, system on a Chevrolet 490. The valve timing we would suggest is as follows: Intake opens 7 degrees after upper dead center and closes 42 degrees after lower dead center. Exhaust opens 55 degrees before bottom dead center and closes 8 degrees after top dead center.

BATTERY BOOSTERS

Q—What is a battery booster?

2—Publish wiring diagram of a battery booster on an Overland car, 1916 model 83. This booster is installed in a Dixie magneto.—Davis Garage, Neshkoro, Wis.

1—A battery booster in the ordinary meaning and application of the term is not applied to the electrical system of a motor car. It is generally applied to work where a great many batteries are in use to provide for stability of the current or voltage supply, as in the case of railway practice. In work similar to this the Entz booster system has been used extensively. A diagram showing

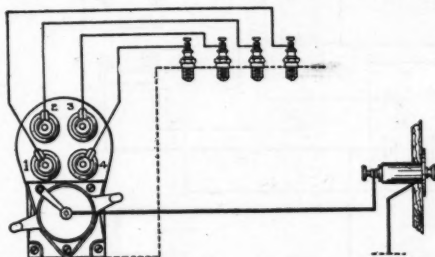


Fig. 3—Connections on Simms magneto

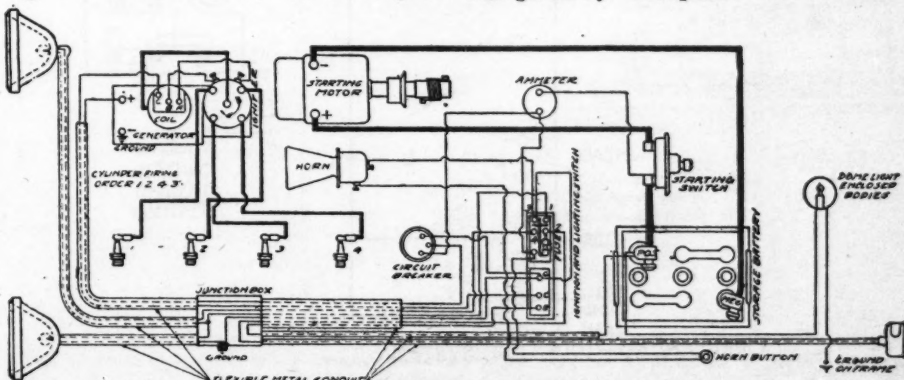


Fig. 4—Two wire Autolite system as used on Chevrolet 490

the connections of an Entz booster system is shown in Fig. 7.

In this system the coil A carries the current from the generator, B carries the external load, while the shunt coil C carries a current that is practically constant and which is opposed to A and B. The coils are so arranged that there is no boosting action when the outside load and the generator load have a certain definite value. That is when the generator is taxed to the point where it operates most efficiently. Now when the coils are arranged to produce this action, any increase in the outside load will then cause a resultant booster voltage in the direction that will make the battery discharge and so help out the generator. But should the load decrease where the generator can more than take care of the line load, then the booster voltage will reverse and cause the battery to be charged.

In effect, this is similar to the battery-generator system employed on most of our cars, but the arrangement is a little different, so it is not now termed a booster.

2—The magneto which is installed on the Overland 83 does not furnish current to the battery. A regular generator of the Auto-Lite make, having a reversed field control regulation is employed on this car. The diagram for this car was shown in the Jan. 1 issue of Motor Age.

A BRONZE PLATED WHEELBASE

Q—The engine in my car misses, smokes, gives no power and smells of burnt cork. The agent claims the crankshaft is bent, the garage man says the pistons are cracked, and my man says the pump is busted. What do YOU think is wrong?—H. M. S., New York City.

This is a hypothetical question, elementary yet characteristic of the hypocritical Intususeception of the elements leads to an anachlotic state bordering upon mental aberration.—T. J. F.

Editor's Note—In the early days when motorists knew that their car had a flexible wheelbase and a carburetor that coordinated with the functioning of the compound differential, speaking in the language of that day, the above is a typical case of the type of questions that might be asked by some motorist or some garage owner, and the answer that was given by "a expert."

Miscellaneous

CHANGING BRAKES

Q—Instruct how to install an emergency brake in place of the clutch brake on a Dort car? Where can a suitable lever be obtained?

2—What is the address of the company that manufactures the Spacke car?

3—Where can I obtain a specification list giving valve sizes of different cars?—Frank A. Pelican, Hillhead, S. Dak.

1—The task of installing an emergency brake of the lever type on this car will take quite a time and will be rather costly. Anyway, the brake rod which is now attached to the clutch pedal will have to be disconnected and attached to the right hand foot pedal. Then the emergency brake lever will have to be installed, and this will have to be connected to a special bracket secured to the side of the transmission housing. The brake rod which now is attached to the emergency foot pedal will have to be disconnected and reconnected to the lever. The pedal ratchet will also have to be removed or else this is apt to make trouble at some time when by accident you might inadvertently allow the ratchet to become fast when it really ought to be loose.

2—The Spacke car is manufactured

by the Spacke Machine and Tool Company, Indianapolis, Ind.

3—See MOTOR AGE Maintenance Data sheets, 46 to 56, which appeared July 24 to Oct. 2, 1919, inclusive.

MIXING OIL AND GAS

Q—Will mixing oil with gasoline help lubricate closely fitted pistons?—How much oil should be mixed in one gallon of gasoline for this purpose?—Frank A. Pelican, Hillhead, So. Dak.

This is a procedure that we can not recommend. The gasoline gives to the two opposing metal surfaces a cutting action that is detrimental to the wearing qualities of the metal. This is the one big cause for all the grief in the crankcase dilution difficulties that are so common these days. There is too much gasoline in the lubricating oil now without going to the extra trouble of diluting the oil purposely. No, we would much rather recommend a good grade of lubricating oil to wear the metal surface in with. If you really want to wear the metal down, try a stunt like many of the race drivers do with their cars. Obtain from your local jeweler the very best silver polish that he handles and recommends. The kind that you would trust to shine up the back of an old heirloom

watch. Place about two tablespoons full of this material in the lubricating oil of the crankcase and run the engine for about 25 miles or so. This material will shine up the bearings and cylinder walls wonderfully without effecting any injury on the surface of the metal.

SPECIAL AXLE SPINDLES

Q—Publish address of Adams Axle Co.

2—What concerns would make special steel spindles for front axles on automobiles?

3—What would be a good composition to have spindles made of? Is not Chrome vanadium considered the best? Would the cost of such spindles be prohibitive for ordinary cars?—John P. Schwarz, Miller, S. Dak.

1—The address of the Adams Axle Co. is Findlay, Ohio.

2—These are generally made by the company that makes the axle, and it might be that if you have an Adams axle and want some special steel used in a new set of spindles, they will make it for you.

3—Chrome vanadium steel is a very strong metal and its strength may, according to the proportion of the various elements, run as high as 120,000 lb. per sq. in., or even better.

VACUUM SYSTEM ON CHEVROLET

Q—Instruct how to install vacuum system on Chevrolet car, model 490.—J. Stanley Ford, Findlay, Ill.

There should be no need for installing a vacuum tank on the Chevrolet 490, if the car is to be used as it is. The conditions of the topography in Illinois do not seem to warrant a vacuum installation on this car, but if you are rebuilding your car and are locating the gasoline tank at the rear of the car, then of course you will need a vacuum tank or some other means for fuel feed. As was described in last week's issue, where an illustration of the piping layout for the vacuum tank installation, though not for the same kind of replacement, you will need to tap the intake manifold and lead a pipe connection from this point to the vacuum tank. Then you will have to install a gasoline feed pipe from the tank to the vacuum tank.

LOWERING STEERING GEAR

Q—Explain method of lowering steering gear on a 1912 model Reo.—Charles M. Dawson, Piketon, Ohio.

Refer to Fig. 10. Here you will see the steering gear as used on this model Reo. To lower the steering gear you will have to drill two new holes in the frame. The two bolts designated as A are located on the bracket that holds the steering gear to the frame. These are secured to the frame, through the now existing holes. If the steering is to be lowered loosen these two bolts and then drop the gear to its required place. Then mark with the aid of a prick punch and a hammer the centers of these two holes, in their new position. The holes should now be drilled, the bolts inserted and the job is done.

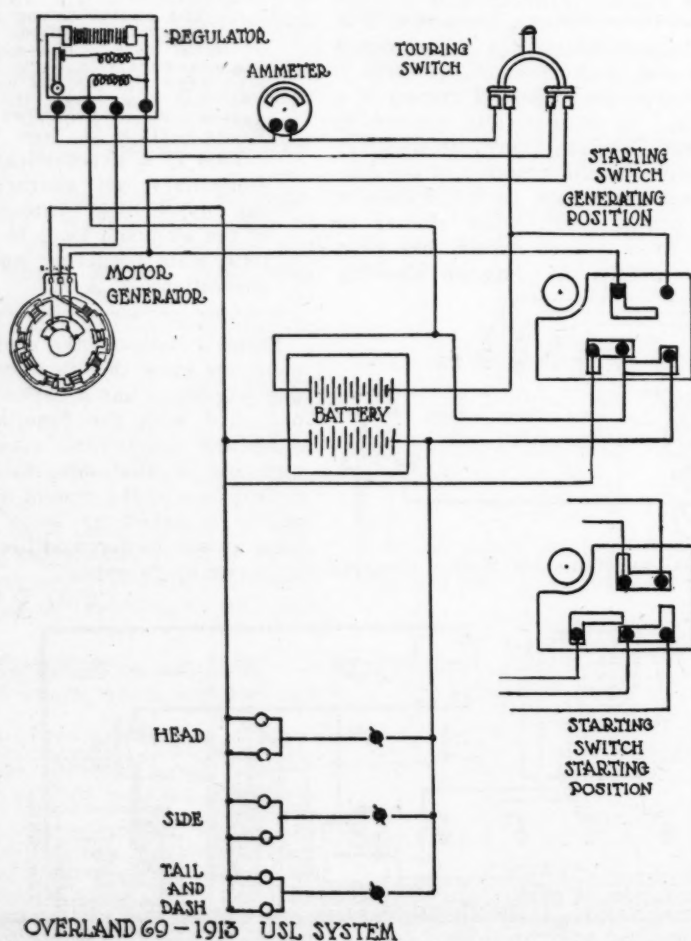


Fig. 5

Rotary Valve Engine

Q—Why is the rotary valve automobile engine not popular?

2—Is an air cooled engine as efficient as a water cooled one? Why?

3—Where can data on the following engines be secured: Knight slide valve, Liberty twelve, Essex, Buick and Stanley steamer?

4—Is a valve-in-head engine more efficient than the other kind?

5—Is a ball bearing engine better than one with plain bearings?—Overne J. Summers, Memphis, Tenn.

1—Simply because it has not as yet been made with any degree of success. There have always been several great difficulties in the way of producing a successful rotary valve engine.

In the first place, if the rotary valve is made perfectly cylindrical there is no means for adjusting the sleeve in case of wear. So it therefore becomes practically necessary to make the valve of tapered section which presents another great difficulty. The sleeve if extended over the entire length of the engine at its top, is apt to expand and so become bound in the tapered hole in which it revolves.

The problem of manufacturing the head of the engine with a tapered hole cut very accurately may seem to be a problem of trivial consequence at first thought, but when the manufacturing considerations are pondered on for a while it soon becomes apparent that this is some job. An engine of this type which the writer had occasion to examine rather thoroughly seemed to be a perfectly good engine, but it couldn't be made because the company could not procure a machine to make the tapered bore, over 30 in. in length, and accurate to 0.001 in. so the engine was abandoned.

2—Considering thermal efficiency an air-cooled engine is more efficient than a water-cooled engine. The operating temperature of the Franklin is about 320 deg., while the operating temperature of the ordinary motor car engine is 180 deg. This means that because the entire range of operating temperature is confined to limits much higher than with the water-cooled jacket cylinder wall and the thermal efficiency is consequently higher.

3—We suggest that you see your local dealer in Memphis and have him give you the material you want on the various engines. The Liberty engine material he probably can not give you, but for this we advise you to procure an old copy of Automotive Industries, Dec. 12, 1918, in which the Liberty engine was described in considerable detail and well illustrated.

4—A valve-in-head engine is slightly more efficient than a T-head on L-head engine. It has the advantage that the combustion space is more compact in shape and that it has no dead spaces where the expanding gases spend their force on rigid castings. There is a noticeable trend toward the increased use of the valve-in-head engine as the specifications of the average car will

show printed in the show issue of MOTOR AGE.

5—We do not think that a ball bearing engine is better than a plain bearing engine. Ball bearing engines do not seem to hold up as well as they ought to. It must be remembered that there is a terrific stress and strain on the bearings of a gas engine and the greater

area to hold this stress the less the intensity of pressure and the greater the life of the bearings.

TIMING FOR STUTZ

Q—What is the correct valve timing for a 1913 or 1914 Stutz car, model 4 B, with a four-cylinder, T-head engine? I have put a new crankshaft in this engine and cannot tell by the marks on the fly wheel. —E. Christensen, Tacoma, Wash.

The timing for this engine is shown in Fig. 9.

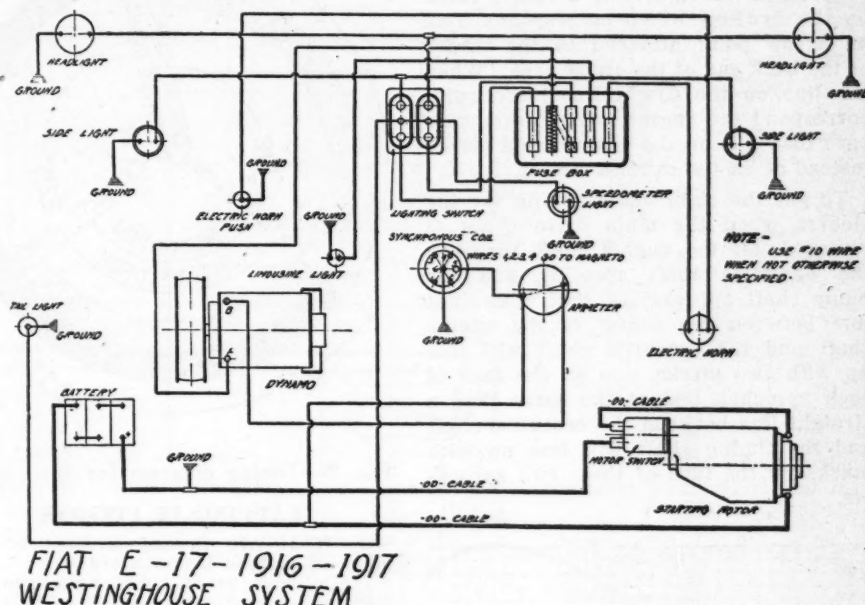


Fig. 6

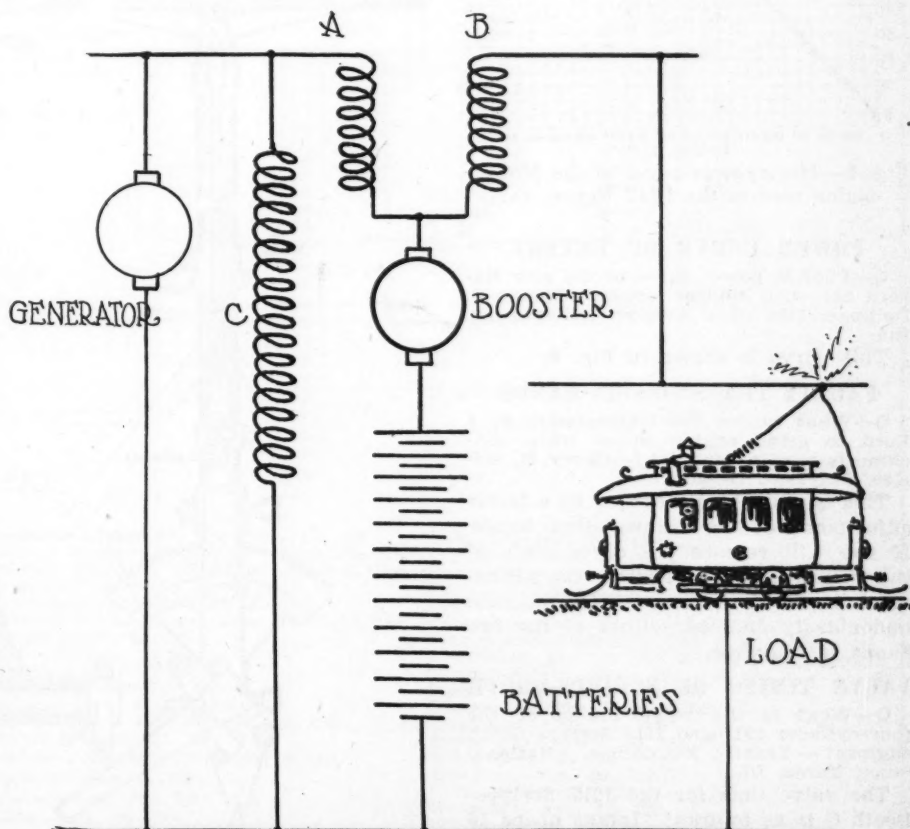


Fig. 7—Diagram showing connections of a booster as applied to a street car circuit for the stabilizing of the generator load

INSTALLING TIME GEARCASE CHAIN

Q—On a four-cylinder Lyons-Knight car, made by the Lyons-Atlas Co., Indianapolis, Ind., it is necessary to install a new time gear case chain, which drives the sleeves and magneto shaft. Instruct how to install this chain and also to get the original time setting.—Lockhar Bros., DeGraff, Ohio.

For ignition timing the proper setting is to have the magneto spark occur four inches in advance of the center point on the flywheel when the spark lever is fully advanced. There is a center mark on the flywheel which corresponds with an arrow point attached to the center of the back end of the crank case. When the line on the flywheel and the point correspond the engine is on center. Be sure that it is on the compression center instead of on the exhaust center.

To get the right valve setting for the sleeves when the main drive chain is removed, set the engine shaft sprocket, the eccentric shaft sprocket and the pump shaft sprocket so that a straight line between the center of the engine shaft and the eccentric shaft will line up with two marks, one on the face of each sprocket, and at the same time a straight line between the eccentric shaft and the timing shaft will line up with marks on the face of these two sprockets.

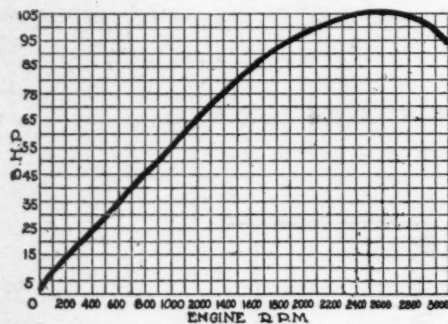


Fig. 8—Horsepower curve of the Monson engine used in the 1919 Revere car

POWER CURVE OF REVERE

Q—Publish power curve of the new Revere car with Monson engine.—Henry G. Dollman, 1126 Park Avenue, Indianapolis, Ind.

This curve is shown in Fig. 8.

FAULTY TRANSMISSION BANDS

Q—What causes the transmission of a Ford to grind at low speed while machine is running in high?—Harry E. McKee, Jefferson, Oregon.

This is undoubtedly caused by a faulty adjustment of the transmission bands. If you will remove the cover plate of the transmission and test out the adjustment of the two front bands, you will undoubtedly find that either of the two bands is dragging.

VALVE TIMING OF SCRIPPS-BOOTH

Q—What is the valve timing of the four-cylinder 1917 and 1918 Scripps-Booth engines?—Frank McCutchen, National Stock Yards, Ill.

The valve time for the 1917 Scripps-Booth G is as follows: Intake opens 16 degrees after upper dead center and closes 52 degrees after lower dead center. The exhaust opens 40 degrees be-

fore bottom dead center and closes 16 degrees after top dead center.

ENGINE IN HALLADAY

Q—What is the make of the engine in a model 40 Halladay car, Car No. 12426 and engine No. 88822?—Proctor-Smith Motor Co., Mena, Ark.

We believe that this is a Rutenbur engine.

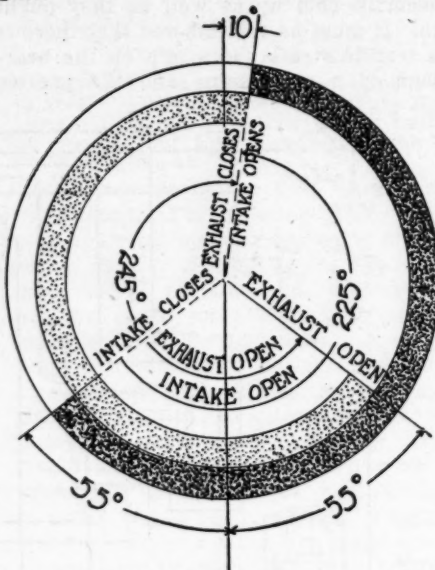


Fig. 9—Timing diagram for Stutz engine

LAPPING IN PISTONS

Q—What are the advantages of lapping old pistons in cylinders?

2—Do leak proof rings help compression in scored and worn cylinders?—Frank A. Pelican, Hillhead, S. Dak.

1—In case a cylinder is rebored only

lapping has a very decided advantage. But when the cylinders are reground accurately and new pistons are fitted, which have been ground to size accurately, there is no need of lapping the pistons in. The whole idea of the lapping process seems to be losing ground. Still, we do not mean by that that the lapping process has been supplanted by some other better process. The scheme of lapping in has its place. Where a cylinder is to be fitted with new rings only, without any grinding or any reboring, and the same pistons are to be used, then an old piston can very conveniently be used to lap in the new rings.

2—Yes, some patented ring of accepted and accredited make will help out the compression problem a good deal. Of course, where the score marks are large enough to impair the operating of the engine, then patented rings will not help. A patented ring of multi-piece construction is generally more flexible than a one-piece ring, but it is not so flexible that it will cover the grooves of a score mark.

VALVE TIMING ON HAVERS

Q—Instruct how to set the valves on degrees and explain when the intake valve should open on a 1913 Havers Six.—John Weiss, Naugatuck, Conn.

The intake valve opens 10 deg. after top dead center and closes 35 deg. after bottom dead center. The exhaust valve opens 40 deg. before bottom dead center and closes 8 deg. after top dead center.

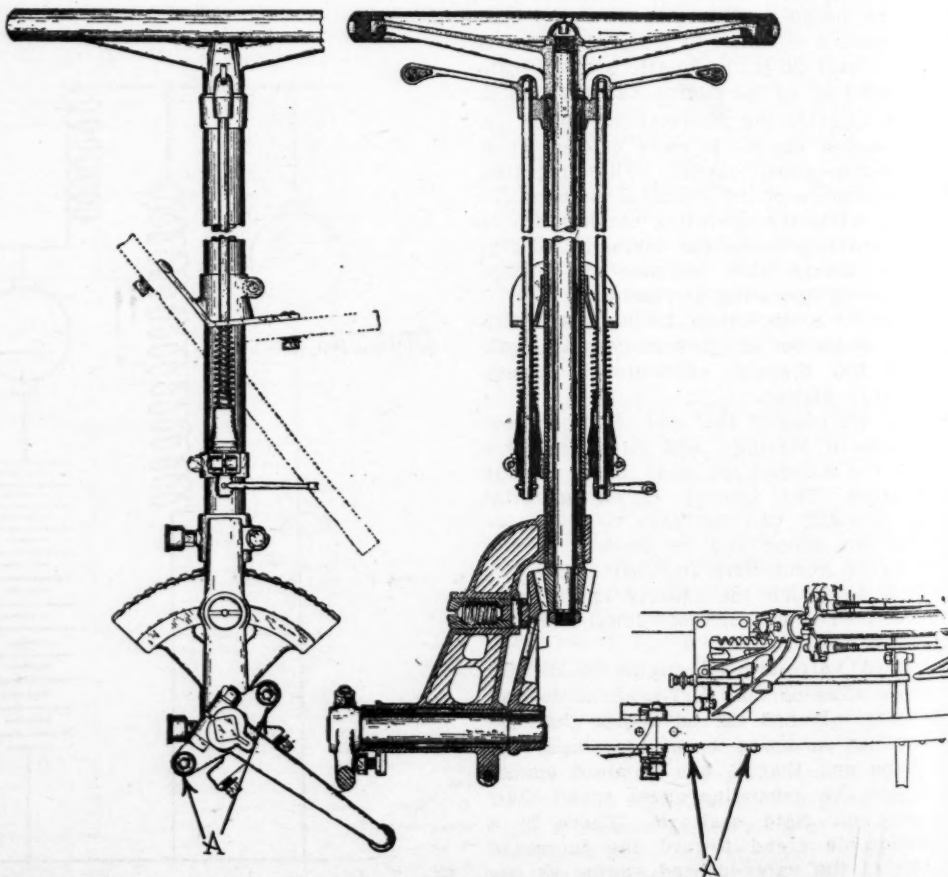
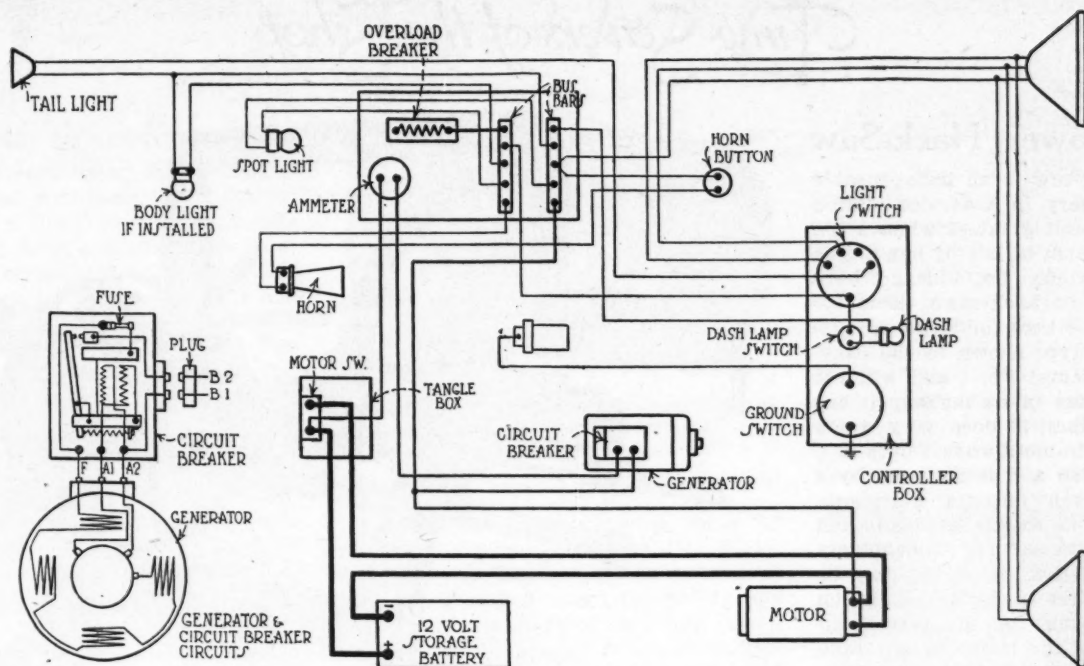
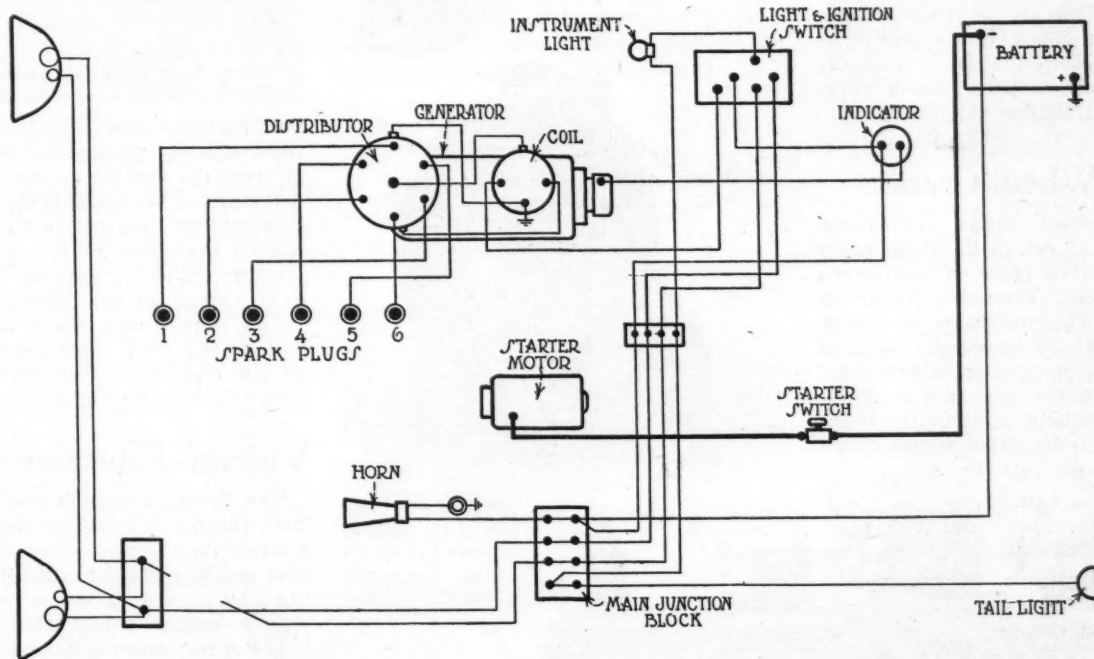


Fig. 10—The steering gear used on the 1912 Reo, for which method to be used in lowering is described on a previous page

Motor Age Weekly Wiring Chart No. 65



1917-1918 WHITE G.M. LEECE-NEVILLE SYSTEM



1918 VELIE L-39 REMY

THIS WEEK

1917-1918 White—1918 Velie

Allen—Dec. 18, '19
Auburn—Nov. 27, '19
Briscoe—Oct. 16, '19
Bulek—Oct. 23, '19
Case—Oct. 2, '19
Crow-Elkhart—June 26, '19
Chalmers—Nov. 27, '19
Cutting—Nov. 6, '19
Daniels—Dec. 4, '19
Davis—Dec. 4, '19
Dorris—Dec. 11, '19
Empire—Oct. 30, '19
Essex—Oct. 23, '19
Ford—May 15, 22, '19

Franklin—June 19, '19; Dec. 11, '19
General Battery Charing—Sept. 25, '19
General Magneto Diagram—June 5, '19
Haynes—Oct. 9, '19
Hupmobile—Oct. 16, '19
Internal Connections—July 10-17-24, '19
Kecton—Nov. 6, '19
King—July 3, '19
Kissel—July 3, '19
Lexington—Jan. 1, '20
Liberty—Jan. 1, '20
Marmon—Dec. 25, '19; Jan. 22, '20
Maxwell—Aug. 14, '19
Mercer—Aug. 28, '19; Nov. 27, '19
Mitchell—Jan. 8, '20
Monroe—Oct. 30, '19
Moon—Jan. 29, '20
National—June 19, '19; Feb. 12, '20

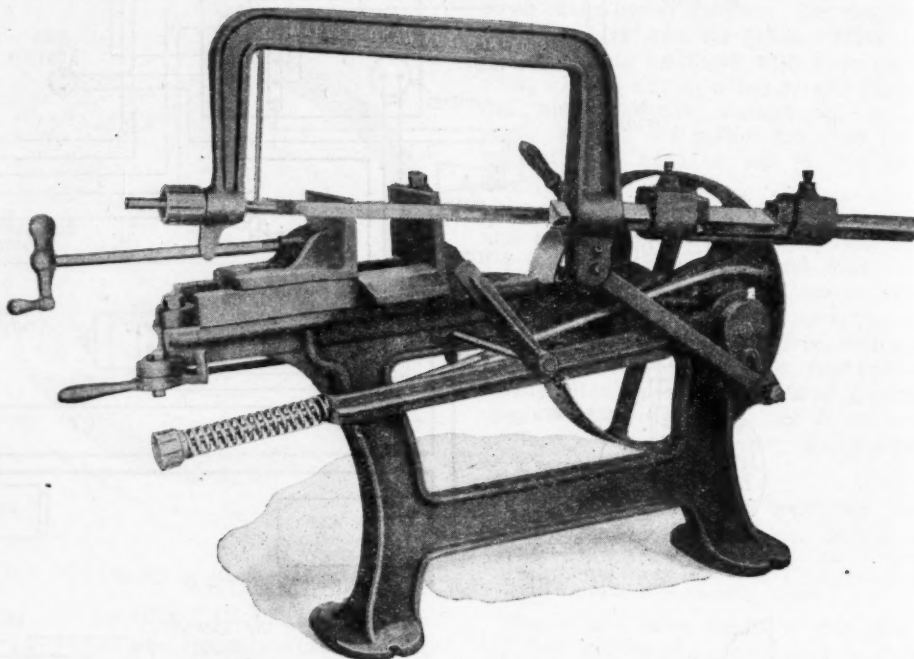
Oakland—Oct. 16, '10
Olympian—Jan. 22, '20
Owen Magnetic—Sept. 18, '19
Packard—June 19, '19; July 31, '19
Paize—July 3, '19
Paterson—June 26, '19; July 9, '19
Pierce-Arrow—Oct. 2, '19; Feb. 5, '20
Ree—Aug. 21, '19; Oct. 9, '19; Nov. 13, '19
Scripps-Booth—Jan. 15, '20
Stanley—June 26, '19
Stearns-Knight—Jan. 8, '20
Stephens—Feb. 12, '20
Studebaker—Dec. 25, '19
Stutz—Feb. 5, '20
Templar—Jan. 29, '20
Velle—Sept. 25, '19
Westcott—Jan. 15, '20
White—Sept. 25, '19
Special Systems for Fords—May 14-22, '19

Service Equipment

Time Savers of the Shop

Marvel Power Hack-Saw

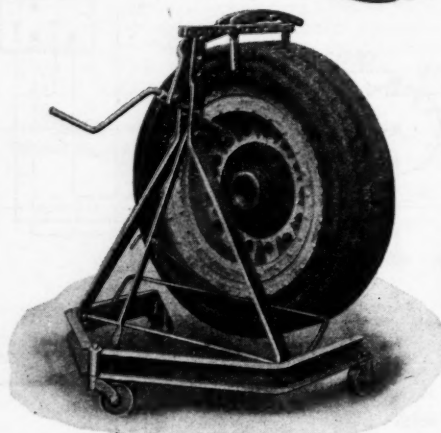
A power hack-saw is an indispensable piece of machinery in a service station and its need is felt greatest when a big piece of metal must be cut by hand. The Armstrong-Blum Mfg. Co., Chicago, have a great variety of hack-saws, some for small work and others for large production work. The type shown in the illustration is the Marvel No. 4 and while it is rather elaborate in its makeup it has the advantage that it does very quick work. The saw frame always moves in a horizontal position and is actuated by a crank lever which imparts a smooth, even cutting stroke to the saw blade and gives a very quick return. The holders are so arranged that the blade may be tilted either to the right or left when necessary by means of the two small screws at ends of the frame. The stroke is adjustable and can be changed from 4 to 6½ in. by means of the shifting bolt in the crank. An old reliable plunger pump with ball check valves and overflow tank is provided to give a steady stream of cutting compound when working on steel and similar metals.



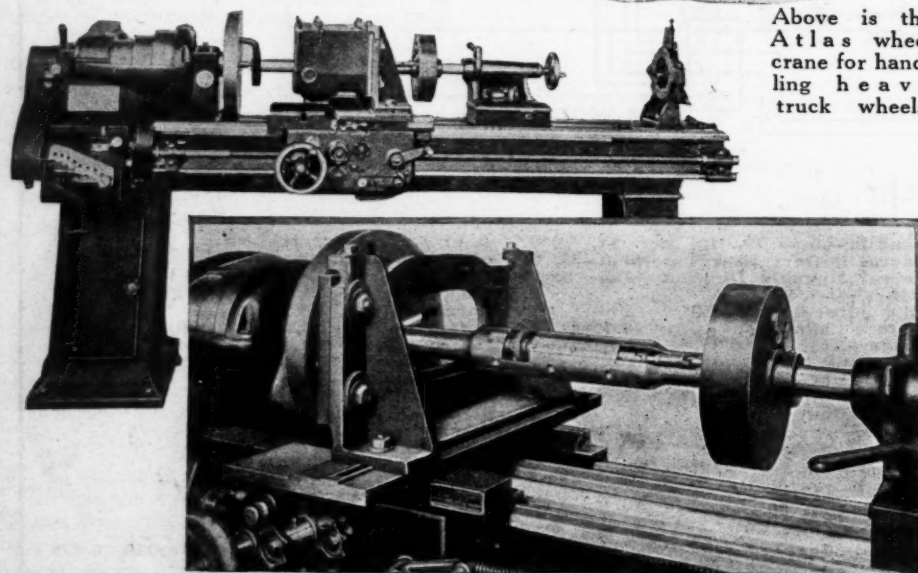
Marvel power hack-saw

Atlas Wheel Crane

The Atlas wheel crane for motor trucks which is shown in the illustration is an indispensable piece of equipment for the shop doing extensive repair on motor trucks. The weight of a wheel, which amounts to several hundred pounds in some cases, and this is altogether too much for any two or three men to handle without injuring the bearing. To this end the Atlas wheel crane



Above is the Atlas wheel crane for handling heavy truck wheels



Vulcan precision grinder. It is not necessary to tear down the lathe to use the grinder

was designed and with it one man can remove and replace the wheel without injuring the bearing, or the drive spindle. A feature of the crane is the positive disk that catches hold of the steel rim of the tire on each side of the wheel. An adjustable splice bar permits the grab-hook to be spread, to any desired width.

The heavier the wheel is the tighter will be the grip. This machine is made by the Thompson Auto Specialty Co., 36 East Chestnut St., Columbus, O.

Vulcan Precision Grinder

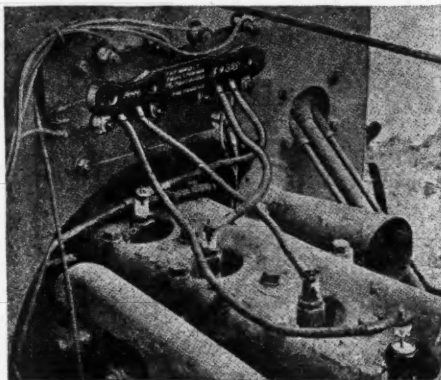
The Vulcan precision grinder shown in the illustration made by the Vulcan Appliance Co., Denver, Colo., is a grinder that can be applied to the lathe for grinding any sort of a motor car, truck or tractor engine bore. With this grinder it is not necessary to tear down the lathe and install a lot of other contrivances before the grinder can be used. In fact the manufacturer claims that fifteen minutes' time is all that is necessary to fit the attachment to the lathe. A special angle plate is furnished to fit any size of lathe, that is, this angle plate is furnished to fit the lathe that the grinder is to be used on. After the angle plate has been attached to the carriage of the lathe it is ready for the block to be bolted in place. The grinder is set on the centers of the lathe and centered for the cylinder bore, the grinding can then be started. The equipment with this grinder consists of two wheels of 1½ in. and 2 in. diameter, an angle plate, a driving head, a tail spindle bushing and one diamond dresser.

The Accessory Corner

New Fitments for the Car

Hi-Volt Transformer

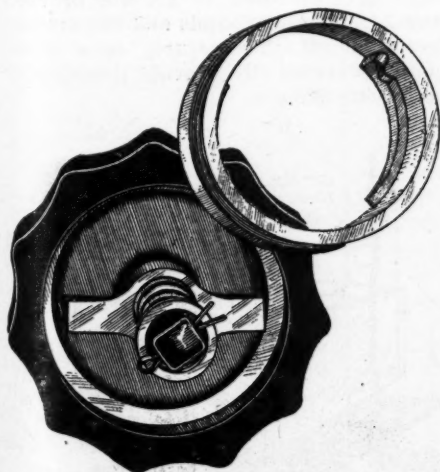
This is an intensifying device that is secured to the dashboard of the Ford car, where the high tension terminals are connected to it and the cables connected to the terminals of the intensifier. The installation is very easily made and the services of a mechanic are not needed to put the device on the car. This article is made by the Hi-Volt Mfg. Co., Milwaukee, Wis.



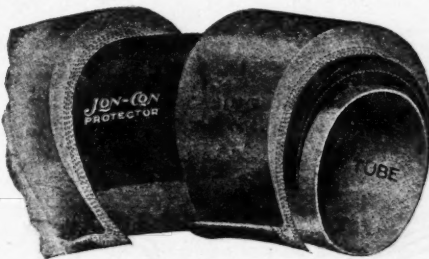
Hi-Volt transformer for intensifying the Ford ignition current

Jiffy Radiator Cap

The Jiffy quick detachable radiator cap is a new contrivance that saves one's hands from becoming burned by removing the radiator cap. This cap because of its quick detachable feature allows one to simply give the cap a quick twist and the cap comes off. A snap lock in the throat of the filler cap keeps the cap on tight and prevents it from rattling. The release is made by turning the cap about one-quarter of a turn. This is made by the Atlasta Specialty Mfg. Co., St. Louis.



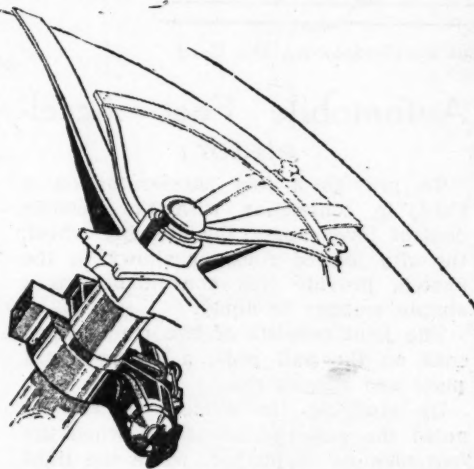
Jiffy radiator cap which will keep you from burning your hand when removing radiator cap



Jon-Con tire protector is inserted between the casing and the tube

Jon-Con Tire Insert

The Jon-Con tire protector, made by the Jones-Conover Products Co., Philadelphia, is a protector of the insert type that is inserted between the casing and the tube. It is made of very firm rubber in which one layer of fabric is embedded. It does not completely surround the tube but covers the vulnerable part only and protects it from nails and stone bruises. This tire protector lists at \$5 to \$14, depending upon the size.



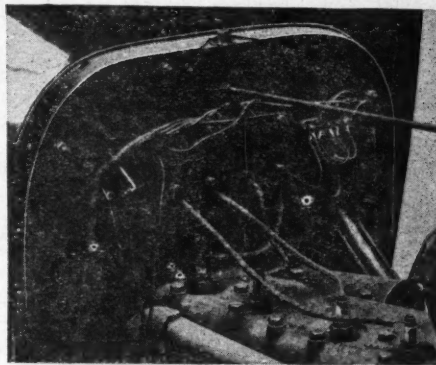
Hershey car lock. It locks the steering wheel to the steering column post

Hershey Car Lock

The Hershey car lock which is shown in the illustration, is of the type that locks the steering wheel. A strong hardened-steel pin passes through the steering column post into the shaft itself which holds the column and the shaft rigidly together and prevents it from being turned. A pin tumbler-lock is fitted which holds the two portions of the lock together. There are no loose parts about this lock that might be lost or which might cause a rattle. It has passed the Underwriters' Laboratories tests. The lock is made by the Hershey Mfg. Co., Denver, Col.

Campbell Rainshed for Fords

A rainshed as it is called, manufactured by the Perkins-Campbell Co., of Cincinnati for attachment to the Ford car for the purpose of keeping the dashboard dry so that water will not leak in under the hood and short circuit the high tension wire has just been introduced. This device is fitted over the dash as the illustration shows and it forms a natural drain for the water so that it will not wet the dashboard and thus short-circuit the high tension wires.



Campbell rainshed will keep the coils on the Ford from getting wet

General Electric Soldering Iron

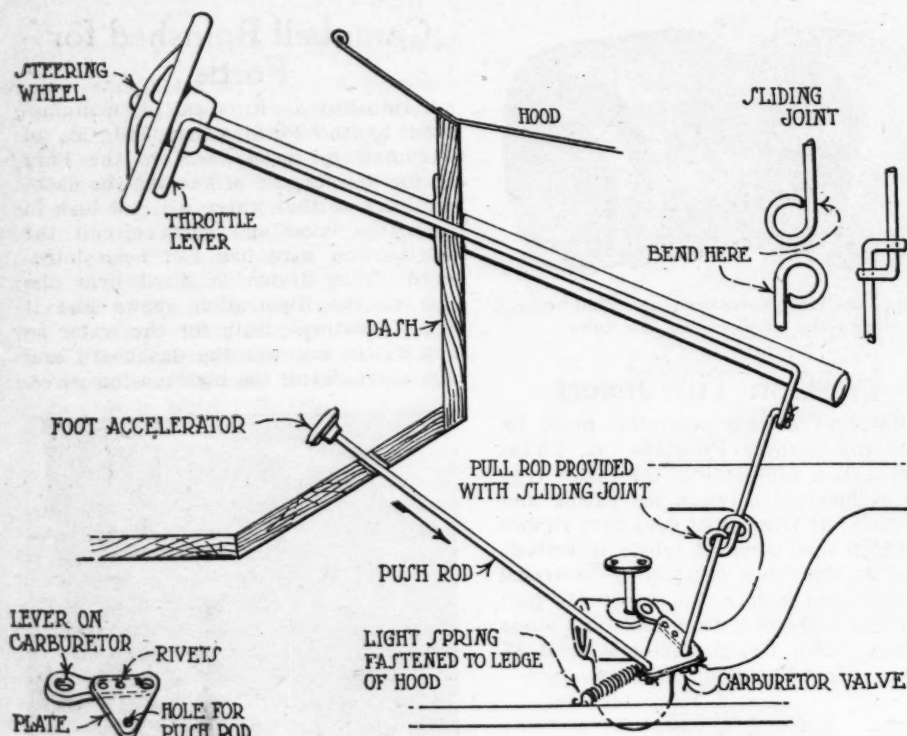
The General Electric Company of Schenectady, N. Y., has recently brought out a soldering iron that has a particular field of application in the automotive repair man's kit. The spiral wire which surrounds the handle is a fire preventative device that prevents the hot part of the iron from making contact with whatever material the iron is resting upon. It has a large heating capacity and because of the flexibility of the handle can be used to reach inaccessible places.



General Electric soldering iron

The Automotive Repair Shop

Practical Maintenance Hints



Here is a simple idea for making a foot accelerator for the Ford

Automobile Foot Accelerator

To provide a foot accelerator on a Ford, in connection with the throttle control lever under the steering wheel, the slip jointed rods, as shown in the sketch, provide this convenience in a simple manner to apply.

The joint consists of two ring shaped ends on the pull rods, a spring metal plate and a push rod.

By studying the sketch, it will be noted the pull rod telescopes when the foot member is pushed, while the light spring returns the valve connection, when the foot member is released. The feature applies to practically any type of car that is not equipped with an accelerator.

Device for Cleaning Grease and Dirt From Engine

The Water Department of the City of Los Angeles uses a novel method of cleaning grease and dirt from the automobile engines used in the Water Department.

A cylinder to which a hose and nozzle has been fastened is filled with gasoline. The bottom of the cylinder is connected with the city water main. By opening a valve the water from the main enters the bottom of the cylinder and acting as a piston, forces the gasoline out through

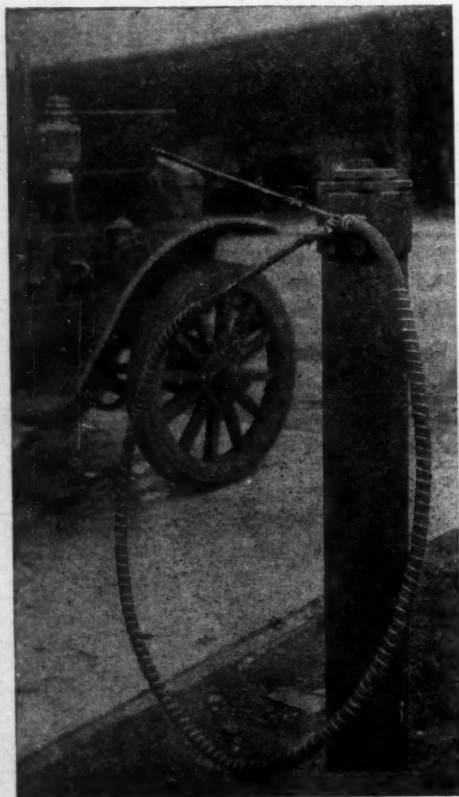
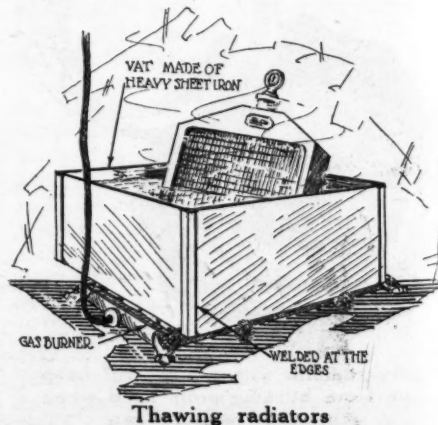
the nozzle with such force, that the grease and dirt are quickly removed from the engine parts. When the gasoline in the cylinder has all been used, the water from the main is turned off, and another valve opened at the bottom of the cylinder, which permits the water to be drained from the cylinder, ready for another application of gasoline.

Thawing Radiators

To save time in thawing radiators which are frozen a hot water vat is desirable. If washing soda is added to the water it cleans the radiator thoroughly at the same time, loosening up sediment on the inside and cleaning the outside so that little or no extra cleaning is required for soldering. Such a vat should be made of heavy sheet iron welded at the edges and may be supplied with heat from a small gas burner placed underneath.

Automobile Brake Lubrication

The bands of service brakes on automobiles receive little or no attention. The glazed surface of the lining does not act quickly, or is it dependable. The first step is to go over the lining with a squirt gun full of kerosene, while this is soaking well into the lining, go over the opposite brake also with kerosene, cleaning also the connections for inspection and adjustment if required. Give the kerosene a half hour at least to soak well into each lining, giving it the second dose of kerosene if desired. After this fill the squirt gun with clean engine oil and squirt this into the bands, leaving it to soak into the open pores over night. In the morning wipe off the surplus oil, start the car and apply the brake several times to get rid of any excess between the bands and the drums. Treatment of this nature, once each month or two, will provide dependable and silent brakes.



A novel method for cleaning grease and dirt from an engine

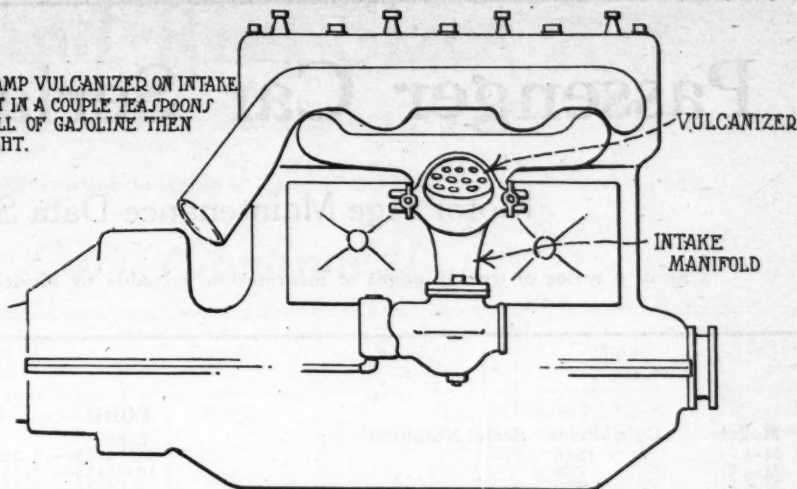
A Simple Hydrometer

A hydrometer sufficiently accurate for ordinary use about a machine shop can be made up from a long, small diameter bottle, a couple of lead washers, cork and piece of paper.

Take a piece of paper slightly longer than the bottle, place it inside, and insert the lead washers or slugs to drop flat into the bottom of the bottle, insert a cork and immerse the improvised hydrometer in water, note the amount that the bottle descends into the water. This is done by blackening the outside of the glass with a burning match. Then scratching a line on the blackened surface at the level of the water. Mark on the paper the distance from the bottom to the scratched line. Wipe off the blackened surface and soot it up again with a match.

Repeat the above in alcohol, turpentine, glycerine, gasoline, kerosene or any other fluids that may be used about the shop. If the marks on the paper indicate desired grades of known fluids the value of other materials of the same sort are easily determined, as the hydrometer will either rise or fall below the marking. A test tube of smaller diameter, but longer, for more accurate readings may be procured from the druggist for five or ten cents and the top can be sealed by pushing in the cork

CLAMP VULCANIZER ON INTAKE
PUT IN A COUPLE TEASPOONS
FULL OF GASOLINE THEN
LIGHT.



Heating the intake manifold for an easy start in cold weather

and dipping in paraffine when the tube is graduated.

Starting Cold Motor

Where the usual methods fail to start the automobile engine in cold weather, clamp on the intake, a tire and tube vulcanizer such as the motorist usually carries in the tool kit, put in a couple of teaspoons full of gasoline and light.

The manifold will be heated enough in a few minutes to vaporize the gasoline and get the motor running. This need

not be detached but can be left in place all the winter or until it is to be used on the tires or tubes. No pipe leaks or gasoline drippings should be tolerated near the vulcanizer because of a possible fire.

Repairing Water Jacket

A small leak in the water-jacket of the car may be repaired without the cost of welding by a simple rust method. While this is not considered as good as welding, it costs practically nothing and will often be found handy in cases where it is impossible to get to the welder before having need of the car.

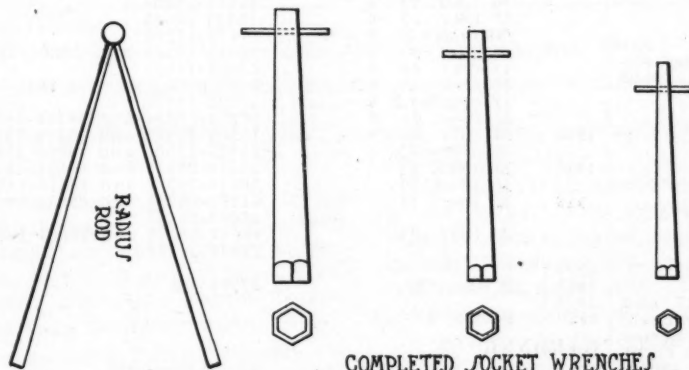
The part of the jacket which has been injured is exposed and filed bright. If the leak is the result of freezing, the two ends of the crack is determined and two small holes drilled through at these points. Soft iron rod or copper is then driven into the hole and the ends filed off flush. This checks any tendency of the crack continuing.

Iron filings are then forced into the crack if it is a wide one, and a solution made of a quarter pound of salammoniac in one quart of water. A small cup of putty is then built onto the side of the jacket which, when filled with the solution, completely immerses the crack. The solution rapidly rusts the iron, and soon the crack will have been completely filled with rust. When the crack is wide, iron filings may be forced into it and will hasten the plugging process.

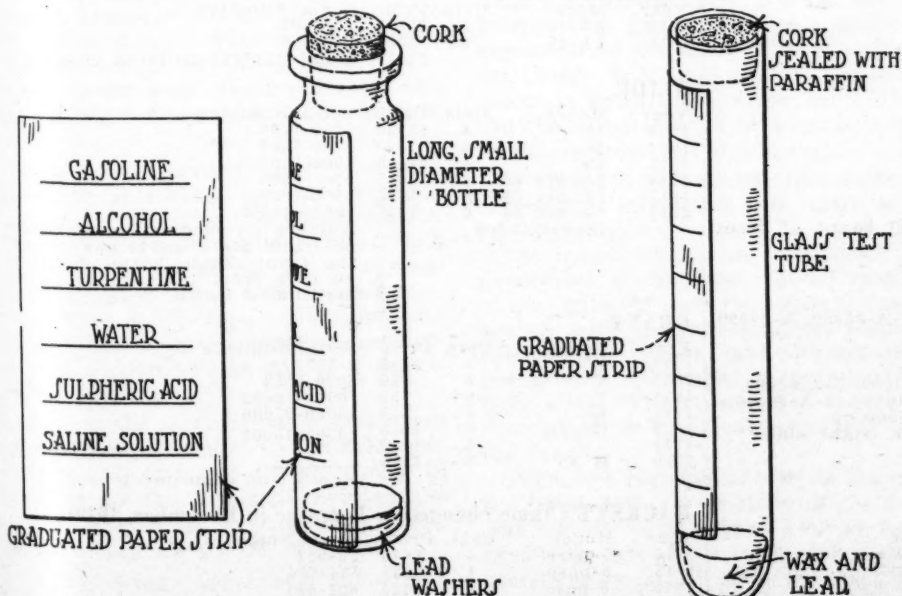
The whole circulation system should be washed out thoroughly after the crack is filled, to check excessive rusting of other iron parts.

Making Socket Wrenches

Herewith are suggestions for some socket wrenches. These wrenches are to be made from Ford radius rods which have been junked. As these rods taper several sizes of wrenches can be made. First cut the length of the wrench desired, then heat the end of the tube to a cherry red and bend and shape it around a nut. The piece of radius rod must be large enough to fit the nut and a hole must then be drilled in the opposite end of the wrench so as that a punch or a small rod can be used for a handle.



Some socket wrenches which can be made from old Ford radius rods



A simple hydrometer accurate enough for ordinary shop use

Passenger Car Serial Numbers

Motor Age Maintenance Data Sheet No. 84

One of a series of weekly pages of information valuable to service men and dealers—Save this page

DORT

Year	Model	Cyls.	Price	Serial Numbers
1915	M-4	4	\$540	
	M-5		680	
1916	M-5A	4	725	
1917	M-6	4	695	9204-24368
	M-9		695	Up to Feb. 21, 1918
	M-9S		1065	
	M-9T		815	
1918-19	M-8	4	865	
	M-8C		1265	24369-49320
	M-11		865	Up to Oct. 4, 1918
	M-11S		1265	
	M-11T		1000	
1920	M-15		985	49331 up
	M-15S		1535	
	M-10		985	
	M-10C		1535	

Number on frame under left head lamp, also on shroud board

ELCAR

Year	Model	Cyls.	Price	Serial Numbers
1916	A	4	.....	500-2000
	B	4	.....	500-2000
1917	D, E, F	4	.....	2001-4999
1918	D, E, G	4	.....	5000-5930
	D, E, G	6	.....	10000-10860
1919	D, H, G	4	.....	5931-9999
	D, H, G	6	.....	10861-14999
1920	D, H, G, K	4	.....	15000 up
	D, H, G, K	6	.....	25000 up

Number plate on dash under engine hood, and on right front spring horn

ELGIN

Year	Model	Cyls.	Price	Serial Numbers
1916	6	6	\$845	1-1720
1917	17	6	985	17-1000-17-3900
	17	6	1095	17-3901-17-6964
1918	17	6	1165	17-6965-17-7400
	17	6	1235	17-7400-17-7764
1919	H	6	1395	101-1500
	H	6	1485	1501-2600
1920	K	6	1485	2601 up

Number plate on 1916-1917 and 1918 models located on dash, right side, under hood. On Series H models, number plate on right front side. On Series H sedan models, number plate on dash, right side

EMPIRE

Year	Model	Cyls.	Price	Serial Numbers
1913-14	31	4	\$950	315750-318672
1914	31-40	4	900	405101-406190
1915	33	4	975	331001-333300
	40	4	975	401001-401675
1916-17	45	4	935	451001-452603
	60	6	1095	601001-603412
1917-18	50	4	1125	50001 up
	70	6	1345	70001-70350
	70A	6	1375	70A001-70A710
	73	6	1360	73001-73059

Discontinued

Number on heel board of front seat

ESSEX

Year	Model	Cyls.	Price	Serial Numbers
1918				A-5000, A-34999, A-35000, A-39999
1919	A	4	\$1595	5000-25000
			1595	60000-63000
			2250	70000-75004
1920	5-A	4	.....	5-A-5000, 5-A-53000, 5-A-60000,
				5-A-69000, 5-A-70000, 5-A-84000,
				5-A-85000, 5-A-89500 up

Number on dash, right side, under hood

F. R. P.

Year	Model	Cyls.	Price	Serial Numbers
1914	A-45 and B	4	\$7000	1-100
1915	A-45 and B	4	7000	1-100
1916	A-45 and B	4	7000	1-100
1917	A-45 and B	4	7000	1-100
1918	B-45	4	.....

Name changed to Porter

FORD

Year	Model	Cyls.	Price	Serial Numbers
10-1-12	9-30-13	4	\$690	15001-332500
10-1-13	7-31-14	4	.....	332501-539000
8-1-14	7-31-15	4	.....	539001-855500
8-1-15	7-31-16	4	.....	855501-1362200
8-1-16	7-31-17	4	.....	1362201-2113500
8-1-17	7-31-18	4	.....	2113501-2756251
8-1-18	7-31-19	4	.....	2756252-3277851
8-1-19	9-30-19	4	.....	3277852-3429400
All Model T				Number stamped on left side cylinder block just above water inlet compression. Car and engine number the same from May 1, 1915

FRANKLIN

Year	Model	Cyls.	Price	Serial Numbers
1912	G (Ser. 1)	4	.....	12801-13180
	D (Ser. 1)	6	.....	14401-14627
	H (Ser. 1)	6	.....	9601-9660
	M (Ser. 1)	6	.....	15201-15411
	GRbt.Ser.1	6	.....	17001-17169
1913	G (Ser. 2)	4	.....	13181-13329
	D (Ser. 2)	6	.....	14628-14657
	H (Ser. 2)	6	.....	9661-9687
	DTorp.Ser.2	6	.....	14901-14921
	M (Ser. 2)	6	.....	15412-15640
	K (Ser. 2)	6	.....	10118-10204
	O (Ser. 2)	6	.....	16003-16025
	GRbt.Ser.2	6	.....	17170-17218
	M (Ser. 3)	6	.....	15641-16215 and 18001-18105
	D (Ser. 3)	6	.....	14658-14812
	H (Ser. 3)	6	.....	9688-9752 and 9801-9815
	DTorp.Ser.3	6	.....	14922-14975
	M (Ser. 4)	6	.....	16216-16894 and 18106-18205
1914	M (Ser. 4)	6	.....	16861-16894 and 18189-18205
	M (Ser. 5)	6	.....	16895-17000 and 19000-19510
1915	M (Ser. 6)	6	.....	19511-20643 and 18311-18527
	M (Ser. 7)	6	.....	20644-21980 and 18528-18658
1916	M (Ser. 8)	6	.....	21981-25234 and 18654-19000
	A (Ser. 9)	6	.....	26001-26175
			.....	40001-59572 and 90001-100000
			.....	27001-28387
1917			.....
1918			.....
1919			.....
1920	Series 9	6	.....	29001 up

GARDNER

Year	Model	Cyls.	Price	Serial Numbers
1920	G	4	\$1125	1 up

GERONIMO

Year	Model	Cyls.	Price	Serial Numbers
1918	6A-45	6	\$1550	400-500
1919	6A-45	6	1550	501-650

Number plate on front of cowl

GLIDE

Year	Model	Cyls.	Price	Serial Numbers
1913	45	4	\$2150	1300-1400
1914	36	4	1890	5100-5600
1915	30	4	1195	7000-7600
1916	Lt. Six 40	6	1095	9000-9500
1917	Lt. Six 40	6	1125	9501-10000
1918	Lt. Six 40	6	1655	10001-10555

Number on models up to 10,000 on name plate inside channel of the front frame horn. Number on cars from 10000 to 10555 on instrument board

GRANT

Year	Model	Cyls.	Price	Serial Numbers
1914	M	4	\$495	0-3033
1915	T	6	750	5000-7053
1916	V	6	795	10000-14002
1917	K	6	825	15000-27000
1918	G	6	1055	30001-40001
1919		6	1120	
1920	H-X	6	1595	

Number on dash under hood

HACKETT (Name changed to Lorraine in December, 1919)

Year	Model	Cyls.	Price	Serial Numbers
1917	5-pass.	4	\$885	50-501
1918	5-pass.	4	985	534-594
1919	5-pass.	4	1125	601-694

Number on dash under hood, and on end of frame

Tire and Rim Sizes

Motor Age Maintenance Data Sheet No. 85

One of a series of weekly pages of information valuable to service men and dealer—Save this page

1919 Cars (Continued)

CAR AND MODEL	Make of Tire	Size of Tire	Style of Bead	Type of Rim	Make of Rim
Stutz, G.	Cord	32x4½		S. S.	Rudge Whitworth
Templar, 445.	Goodrich Goodyear Firestone Cord Firestone Cord Firestone	32x4		S. S.	Parker Firestone
Tulsa, D1-283	Firestone	33x4			
Velie, 38 and 48	Firestone	32x4	S. S.		Stanweld
Velie, 39	Goodyear	33x4½		S. S.	Goodyear
Westcott, A-38	Firestone	33x4	S. S.	S. S.	Firestone
Westcott, A-48	Firestone	32x4½	S. S.	S. S.	Firestone
White					
Willys-Knight, 88-4	Fisk	34x4½		No. 21 Dem. S. S.	Stanweld Houk
Willys-Knight, 88-4	Fisk	35x5		No. 21 Dem. S. S.	Stanweld Houk
Willys-Knight, 88-8	Fisk	35x5		No. 21 Dem. S. S.	Houk
Willys-Six, 89	Fisk	33x4½		No. 21 Dem. S. S.	Stanweld
Willys-Six, 89	Fisk	33x4½		S. S. Q. Dem.	Budd & Houk
Winton, 24 & 25	Standard	35x5	S. S.	C	Firestone

ABBREVIATIONS:

S. S.—Straight Side. Q. D. C.—Quick Demountable Clincher. Dem.—Demountable. Q. D. D.—Quick Demountable Detachable.

WICHITA SHOW MISSING FIRE

(Continued from page 25)

soil is turned until the grain is in the sack. Furthermore, it is exclusively power. There isn't the slightest suggestion of the horse in any of the 100 exhibits which crowd the Forum Garage, where the show is being staged.

Of tractors there thirty-two, with the exception of those which are made right in Wichita, all are displayed by branch houses or distributors. No, there is one new one. This is the 2-wheel, 2-plow capacity, general purpose tractor made by the Baby Savidge Tractor Co., Alton, Ill., and shown here for the first time.

Among the tractors there is a very generous sprinkling of large capacity machines, including two steam models. There is still a demand for this sort of thing in the southwest, but it is gradually growing less. The thresherman, who buys these rigs, is disappearing rapidly and soon the dominant machine in this section will be one of 3 and 4-plow capacity.

Next to the tractors the largest share of attention is devoted to threshing machines. In fact, the thresher may be said to be the dominant note of the show. Nearly all of the better known grain separators are on exhibition.

In the tillage department there is a comprehensive showing of plows with a decided tendency toward the disk type;

disk harrows, cultipackers and grain seeding machinery.

The display of harvesting machinery is not large. The Emerson-Brantingham Co. show a binder, while the International Harvester Co. is showing the combined harvester and thresher which jumped into local popularity last year.

A novelty in this department is the standing thresher, shown here for the first time. This is a threshing machine which is pushed just like a header through the grain fields and threshes directly from the straw without cutting the latter. It is said to be particularly useful in down grain which the binder and the header cannot handle. It is attracting a great deal of attention.

Of thresher accessories, like feeders, belting and lubricating oils, there is a varied display.

The motor truck also is a factor of importance in the show. In all models of nine different makes are shown. These are all, with one exception, the regular commercial models and except for bodies have no special preparation for farm work. The exception is the Samson, which is specifically designed for the farm.

There is a growing interest in the motor truck, but a good many of the men who are interested in it as a future farm possibility are of the impression that something must be done to adapt the truck more particularly for farm needs than yet has been accomplished before

the trade will attain the proportions that are promised.

In all the show is creditable and, as was said at the outset, if it were differently placed in the year and were not so close to the Kansas City National Tractor Show, it would draw much better and be of far more benefit to the industry. It is to be hoped that Wichita will get a different conception of her show by another year and hold it when it will really be of value in the development of the power farming idea.

BEAT BOND ISSUE IN MISSISSIPPI

Jackson, Miss., Feb. 16—The Pate bill appropriating \$25,000,000 for the construction and maintenance of good roads in Mississippi and providing for a general election on a bond issue for this amount, has been defeated in the lower house of the state legislature. The vote against the bill was 64 to 52, and it came after several hours of heated discussion of the measure. Defeat of the bill is believed to have been due to the project, now before congress, to federalize the highway systems of the United States. The Mississippi lawmakers appeared unable to realize that their state would be just that much further advanced in the matter of highways, even were the federalization plan put through. It is believed that the popular vote of Mississippi would have favored the bond issue, and it probably will come before the next session of the legislature, possibly in a slightly different form from the Pate bill.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR		BATTERY			Wiring System	Units Combined	FUSES	
	System	Make	Control	Make	Voltage	Make	Voltage	Make	Amp. Hr.	Voltage			Type	Volts Amp.
Allen.....43	Single	Conn.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	GI.	GT.	6 15
American.....B	Single	Conn.	Hand.	West.	6	Remy.	6	Willard.	90	6	1	S.	3-A.	1,250 20
Anderson.....All	Single	Remy.	Hand.	Remy.	6	West.	6	Willard.	90	6	1	S.	SAE.	6 5
Apperson.....All	Single	Remy.	Hand.	Bijur.	6	Bijur.	6-8	Willard.	108	6	1	S.	Open.	1,250 10
Argonne.....4	Single	Eisemann.	Hand.	West.	12	West.	12	Exide.	100	12	1	S.		12 20
Auburn.....6-39	Single	Remy.	Hand.	Remy.	6	Remy.	6	Willard.	80	6	1	S.		6-8 25
Beggs.....19-T & 19-R	Single	Conn.	Hand.	A-L.	6	A-L.	6	Willard.	80	6	1	GT.	Cart.	6 15
Biddle.....B-1 & B-5	Single	Simms.	Hand.	G & D.	6	G & D.	6	Willard.	90	6	1	S.	GT.	6 10
Bour-Davis.....20	Single	Remy.	Hand.	Remy.	6	Remy.	6	Willard.	103	6	1	S.	GT.	6 15
Brewster.....Single	Single	Berling.	Hand.	U. S. L.	12	U. S. L.	12				1			
Briscoe.....4-34	Single	Conn.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	GI.	GT.	6 20
Buick.....Single	Single	Delco.	Hand.	Delco.	6	Delco.	6	U. S. L.	80	6	1	S.		
Cadillac.....59	Single	Delco.	H. & A.	Delco.	6	Delco.	6	Exide.	130	6	1	GM.		
Case.....V-20	Single	West.	H. & A.	West.	6	West.	6	Willard.	117½	6	1	GI.	5AGT.	50 105
Chalmers.....35-C	Single	Remy.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	106	6	1	GI.		6 151
Champion.....KO	Single	Delco.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	90	6	1	S.	GT.	6 200
Chandler.....All	Single	Bosch.	Hand.	G & D.	6	G & D.	6	Prest-O-L.	105	6	1	S.	GT.	6
Chevrolet.....All	Single	Remy.	Hand.	A-L.	6	A-L.	6	Willard.	80	6	1	GI.	GT.	6
Cleveland.....40	Single	G & D.	Hand.	G & D.	6	G & D.	6	Prest-O-L.	94	6	1	S.	GT.	6
Cole.....All	Single	Delco.	H. & A.	Delco.	6	Delco.	6	Prest-O-L.	50	6	1	S.		
Columbia.....All	Single	At-Kent.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	S.		
Comet.....C-53	Single	Wagner.	Hand.	Wagner.	6	Wagner.	6	Willard.	75	6	1			
Crow-Elkhart.....L-55	Single	Conn.	Hand.	Dyneto.	6	Dyneto.	6	Exide.	120	6	1		Cart.	6 10
Cunningham.....V-3	Single	Delco.	H. & A.	West.	6	West.	6	Willard.	120	6	1			
Daniels.....8-D	Single	Delco.	H. & A.	Delco.	6	Delco.	6	Willard.	140	6	1	S.		
Davis.....51	Single	Bosch.	Hand.	Delco.	6	Delco.	6	Willard.	80	6	1	S.		
Dixie Flyer.....Single	Single	Conn.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	6-80		2			
Dodge Brothers.....Single	Single	Own.	H. & A.	N. E.	12	North East	12	Willard.	50	12	1	GM.	Encl.	1-50 10
Dorris.....6-80	Single	Bosch.	Hand.	West.	6	West.	6	Willard.	115	6	1	S.	GT.	5-8 15
Dort.....15	Single	Conn.	Hand.	West.	6	West.	6	U. S. L.	85	6	1	S.		6 10
du Pont.....A	Single	H. & A.	West.	West.	6	West.	6	Exide.	115	6	1			
Economy.....6-46	Single	Own.	Hand.	A-L.	6	A-L.	6	Willard.	90	6				
Elcar.....All	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	90	6	1	S.	GT.	6-8 20
Elgin.....K	Single	Wagner.	Hand.	Wagner.	6	Wagner.	6	Willard.	90	6	1		GT.	6-8 20
Essex.....A	Single	Delco.	H. & A.	Delco.	7	Delco.	6	Exide.	105	6	1	S.		
Ferris.....T*	Single	Own.	Hand.	Own.	6	Own.		Opt.	80	6	1			
Ford.....9-B	Single	At-Kent.	Auto.	Dyneto.	12	Dyneto.		Willard.	60	12	2	GM.	GT.	14 10
Franklin.....O	Single	West.	Hand.	West.	6	West.	6	Willard.	90	6	1	S.	GT.	6 20
Gardner.....Single	Single	Delco.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	88	6	1	S.		
Geronimo.....H	Single	At-Kent.	Hand.	Bijur.	6	Grant-W.	6	Prest-O-L.	105	6	1	S.	2GT.	6-8 15
Grant.....45-A	Single	Remy.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1		Cart.	6 3
Hanson.....Single	Single	Remy.	Hand.	Remy.	6	Remy.	6	Prest-O-L.	80	6	1			
Harroun.....4-20	Single	At-Kent.	Hand.	Wagner.	6	Wagner.	6	Nat. Carb.			1	S.		
Harvard.....A	Single	Conn.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	100	6	1	GI.		
Hatfield.....All	Single	Opt.	Hand.	Leece-N.	6	Leece-N.	6	Willard.	120	6	2	GI.	GT.	6 5
Haynes.....H. C. S. Special	Single	Delco.	Hand.	Delco.	12	Delco.	6	U. S. L.	80	6	1	S.	GT.	6 20
Hollier.....206-B	Single	R. & B.	Hand.	West.	12	West.	6	Willard.	100	12	2	S.	GT.	15 15
Holmes.....Single	Single	Eisemann.	Auto.	Dyneto.	12		7	Exide.	105	6	1	GM.		
Hudson Super-Six.....Single	Single	Delco.	H. & A.	Delco.	7	Delco.	6	Willard.	80	6	1	S.		6 25
Huffman.....Single	Single	Conn.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	87½	6	1	S.	Encl.	6 10
Hupmobile.....R	Single	At-Kent.	Hand.	West.	6	West.	6	Willard.						
Jackson.....6-38	Single	Remy.	Hand.	A-L.	6	A-L.	6	U. S. L.	94	6	1	GI.	GT.	6-8 15
Jones.....All	Single	Remy.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	120	6	1	GI.	GT.	6 20
Jordan.....F	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	108	6	1	S.	C. B.	
Jordan.....M	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	94	6	1	S.	C. B.	
King.....8	Single	At-Kent.	Hand.	West.	6	West.	6	Prest-O-L.	120	6	1	S.	Cart.	6 10
Kissel.....Single	Single	Remy.	Hand.	Remy.	6	Remy.	6	Willard.	117.5	6	1	S.	3 A. G.	6 20
Kline.....6-55-J	Single	Conn.	Hand.	Wagner.	6	Wagner.	6	Prest-O-L.	80	6	1	S.	5 A. G.	6
LaFayette.....Double	Double	Delco.	H. & A.	Delco.	6	Delco.	6	Exide.	120	6		GM.		6
Leach.....S-20	Single	Remy.	Hand.	West.										
Lexington.....10-C	Single	Conn.	Hand.	G. & D.	6	G. & D.	6	Willard.	100	6	1		GT.	6 15-5
Liberty.....48-6-7	Dual	Wagner.	Hand.	Wagner.	6	Wagner.	6	Willard.	90	6	1	GI.		
Locomobile.....Single	Single	Berling.	Hand.	West.	6	West.	6	Exide.	150	6	1	S.	G. T.	6 10
Lorraine.....Single	Single	West.	Hand.	West.	6	West.	6	U. S. L.	94	6	1	S.	GT.	

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H. & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L., Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch		
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.					
Single...	6-8	18	*6-8	5	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Allen.....43
Single...	6-8	15	*6-8	5	3-4	2	3-4	2	Bethlehem...	7/8	18	Sparton...	American.....B
Single...	6-8	21	6-8	4	6-8	4	6-8	4	A. C.	7/8	18	Klaxon...	Anderson.....All
Double...	6-8	18	*6-8	4	d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Apperson.....All
Single...	12	21	12	6	12	2	12	2	A. C.	7/8	18	Klaxon...	Argonne.....4
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Rajah.....	7/8	18	E. A.	Auburn.....6-39
Single...	6-8	21	6-8	4	3-4	2	3-4	2	Champion...	7/8	18	Trojan...	Beggs.....19-T & 19R
Single...	6-8	21	*6-8	4	6-8	2	d6-8	2	Splitdorf...	7/8	18	Klaxon...	Biddle.....B-1 & B-5
Single...	6-8	15	6-8	5	6-8	2	6-8	2	A. C.	7/8	18	E. A.	Bour-Davis.....20
Single...	12	36	12	4	6-8	2	d6-8	2	Herz-Boug...	7/8	18	Klaxon...	Brewster.....
Single...	6-8	21			6-8	2	d6-8	2	Champion...	7/8	18	Sparton...	Briscoe.....4-34
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Stewart...	Buick.....
Single...	7	18	8	6	4	2	3-4	2	Titan.....	7/8	18	Delco.....	Cadillac.....59
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Case.....V-20
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Schwarze...	Chalmers.....35-C
Single...	6-8	15			6-8	2	6-8	2	Champion...	7/8	18	Garford...	Champion.....KO
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Chandler.....All
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon...	Chevrolet.....All
Single...	6-8	17	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Trojan...	Cleveland.....40
Single...	6-8	21	*6-8	5	6-8	4	d6-8	5	A. C.	7/8	18	Sparton...	Cole.....All
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	Schwarze...	Columbia.....All
Single...	6-8	18			6-8	2	6-8	4	Champion...	7/8	18	Klaxon...	Comet.....C-53
Single...	6-8	15	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	E. A. Lab..	Crow-Elkhart..L-55
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Cunningham...V-3
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	Daniels.....8-D
Single...	6-8	21			6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Davis.....51
Double...	6-8	15			d3-4	2	d3-4	2	Champion...	7/8	18	Garford...	Dixie Flyer.....
Single...	12-16	15			12-16	2	12-16	2	A. C.	7/8	18	Klaxon...	Dodge Brothers.....
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Opt.....	7/8	18	Klaxon...	Dorris.....
Single...	6-8	15			6-8	2	d6-8	2	A. C.	7/8	18	Schwarze...	Dort.....15
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	du Pont.....A
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18		Economy.....6-46
Single...	6-8	17			6-8	2	6-8	2	Champion...	7/8	18	E. A. L...	Elcar.....All
Single...	6-8	15			3-4	2	*3-4	2	A. C.	18 m.m.	1.5 m.m.	Elgin.....	K.....
												Sparton...	Essex.....A
Double...	6-8	17	6-8	2	6-8	2			Champion...	1 1/2	pipe	Ferris.....	
Double...	12-16	21	*12-16	4	6-8	2	6-8	2	Opt.....	7/8	18	Own.....	Ford.....T
Single...	6-8	15			6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Franklin.....9-B
Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Gardner.....G
Single...	6-8	15	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Geronimo.....
									Champion...	7/8	18	Trojan...	Grant.....H
Single...	6-8	15			6-8	2	6-8	2	Champion...	7/8	18	Schwarze...	Hanson.....45-A
Single...	6-8	15			3-4	2	d3-4	2	A. C.	7/8	18	Schwarze...	Harroun.....
Single...	6-8	15	3-4		3-4		*3-4			7/8	18	Harvard...	4-20
Single...	6-8	15	*4-8	4	6-8	4	6-8	2	A. C.	7/8	18	Ecco.....	Hatfield.....A
Double...	6-8	15	*6-8	12	d6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Haynes.....All
Single...	6-8	15	6	4	3-4	2	3-4	2	A. C.	7/8	18	Sparton...	H. C. S. Special.....
Double...	12-16	30			6-8	2	6-8	2	Bethlehem...	7/8	18	Sparton...	Hollier.....206-B
Single...	6-8	15	6-8	4	3-4	2	*3-4	2	A. C.	7/8	18	Klaxon...	Holmes.....
Single...	6-8	15			6-8	2	6-8	2		7/8	18	Sparton...	Hudson Super Six....
Single...	6-8	15	6-8	2	6-8	2	6-8	2	A. C.	7/8	18	Huffman...	
Single...	6-8	15	6-8	4	3-4	2	3-4	2		7/8	18	Trojan...	Hupmobile.....R
Single...	6-8	15	6-8	4	3-4	2	3-4	2	Champion...	7/8	18	Stewart...	Jackson.....6-38
Double...	6-8	15	*6-8	4	s6-8	2	s6-8	2	Champion...	7/8	18	Newtone...	Jones.....
Single...	6-8	18	*6-8	4	6-8	3	6-8	3	A. C.	7/8	18	Sparton...	Jordan.....F
Single...	6-8	18	6-8	4	6-8	3	6-8	3	A. C.	7/8	18	Sparton...	Jordan.....M
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	King.....8
Double...	6-8	18			d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Kissel.....
Single...	6-8	15			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Kline.....6-55-J
	6-8	21	6-8	6	3-4	4	3-4	2		7/8	18	Klaxon...	Lafayette.....
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	Bethlehem...	7/8	18	Leach.....	
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	E. A. L...	Lexington.....S-20
Single...	6-8	21	6-8	6	6-8	4	6-8	2	Titan.....	7/8	18	United...	Liberty.....10-C
Single...	6-8	17			6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Locomobile...48-6-7
												Schwarze...	Lorraine.....

Notes: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor combined; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with headlights; headlight contains sidelight; d,—double contact; s,—single contact.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR	BATTERY				Wiring System	Units Combined	FUSES		
	System	Make	Control	Make	Voltage		Voltage	Make	Amp. Hr.	Voltage			Type	Volts	Amp.
Maibohm.....	B Single	At-Kent...	Hand.	Bijur.....	6	Bijur.....	6	Willard....	94	6	1	S.....	2-A.....	6	20
Marmon.....	34 Single	Delco.....	Auto.	Delco.....	6	Delco.....	6	Willard....	162	6	1	GI.....	Cart.....	12	20
Maxwell.....	25 Single	At-Kent...	Hand.	Simms-Huff	12	Simms-Huff	12	Prest-O-L..	35	12	1	GM.....	Cart.....	6	10
McFarlan.....	127 Double	Opt.....	Hand.	West.....	6	West.....	6	Willard....	90	6	1	GI.....	5 A. G..	6	10
Mercer.....	Ser. 5 Single	Berling....	Hand.	West.....	6	West.....	6	Willard....	90	6	1	S.....	Cart.....	6	10
Meteor.....	KR Single	Simms.....	Hand.	Bijur.....	6	Bijur.....	6	Willard....	90	6	1	S.....	Cart.....	6	10
Metz, Master Six.....	Single	Conn.....	Hand.	West.....	6	West.....	6	Willard....	120	6	1	S.....	GT.....	6	10
Mitchell.....	F-40 Single	Remy.....	Hand.	Remy.....	6	Remy.....	6	Willard....	100	6	1	S.....	GT.....	6	10
Monitor.....	Single	Conn.....	Hand.	Dyneto....	6	Dyneto....	6	Prest-O-L..	110	6	1	S.....	GT.....	6	10
Monroe.....	S-9 Single	Conn.....	Hand.	A-L.....	6	A-L.....	6	U. S. L....	80	6	1	S.....	GT.....	6	10
Moon.....	6-48 Single	Wagner....	Auto.	Delco.....	6	Delco.....	6	Exide.....	120	6	1	S.....	GT.....	6	10
Moon.....	6-68 Single	Delco.....	Auto.	Delco.....	6	Delco.....	6	Exide.....	120	6	1	S.....	GT.....	6	10
Moore.....	F Single	Conn.....	Hand.	A-L.....	6	A-L.....	6	Willard....	80	6	2	S.....	GT.....	6	10
Nash.....	Single	Wagner....	H & A..	Delco.....	6	Wagner....	6	Willard....	100	6	1	S.....	GT.....	6	10
National.....	Series BB Single	Delco.....	H & A..	West.....	6	West.....	6	Prest-O-L..	110	6	1	S.....	GT.....	6-8	5
Nelson.....	D Single	Bosch.....	Hand.	U. S. L....	12	U. S. L....	12	Willard....	72	12	2	S.....	G.....	12	5-30
Noma.....	1-B Single	Delco.....	Hand.	Delco.....	6	Delco.....	6	Willard....	104	6	1	S.....	G.....	12	5-30
Oakland.....	34-B Single	Remy.....	Hand.	Remy.....	6-8	Remy.....	6	Prest-O-L..	85	6-8	1	GI.....	Cart.....	6	10
Ogren.....	6-60 Single	Bosch.....	Hand.	West.....	6	West.....	6	Willard....	120	6	1	S.....	Cart.....	6	10
Oldsmobile.....	37-A Single	Remy.....	Hand.	Remy.....	6	Willard....	6	Remy.....	80	6	1	S.....	Cart.....	6	10
Oldsmobile.....	45-B Single	Delco.....	Hand.	Delco.....	6	Delco.....	6	Willard....	80	6	1	S.....	Cart.....	6	10
Olympian.....	45 Single	Conn.....	Hand.	A-L.....	6	A-L.....	6	U. S. L....	75	6	1	GI.....	Glass....	6	20
Overland.....	4 Single	Conn.....	Hand.	A-L.....	6-8	A-L.....	6	U. S. L....	75	6-8	1	GI.....	Glass....	6	20
Packard.....	3-35 Single	Delco.....	H & A..	Bijur.....	6	Bijur.....	6	Willard....	120	6	1	S.....	GT.....	6	10
Paige.....	All Single	At-Kent...	H & A..	G & D....	6	G & D....	6	Willard....	108.4	6	1	S.....	G.....	6	20
Pan-American.....	All Single	At-Kent...	Hand.	West.....	6	West.....	6	Willard....	100	6	1	S.....	G.....	6	20
Paterson.....	6-47 Dual	Delco.....	Hand.	Delco.....	6	Delco.....	6	Willard....	110	6	1	S.....	G.....	6	20
Peerless.....	Ser. 6 Single	At-Kent...	H & A..	A-L.....	6	A-L.....	6	Willard....	90	6	1	S.....	G.....	6	20
Piedmont.....	4-30 Single	Delco.....	Hand.	Dyneto....	6	Dyneto....	6	Willard....	90	6	1	S.....	G.....	6	20
Piedmont.....	6-40 Single	Remy.....	Hand.	Remy.....	6	Remy.....	6	Willard....	90	6	1	S.....	G.....	6	20
Pierce-Arrow.....	38&48 Double	Delco.....	H & A..	West.....	6-8	West.....	6	Willard....	150	6	1	S.....	5 A. G..	6-8	15
Pilot.....	6-45 Dual	Delco.....	Hand.	Delco.....	6	Delco.....	6	Prest-O-L..	80	6	1	GI.....	Cart.....	12	15
Porter.....	46 Dual	Berling....	Hand.	West.....	12	West.....	12	Prest-O-L..	118	12	1	S.....	Cart.....	12	15
Premier.....	6-D Single	Delco.....	Hand.	Delco.....	6	Delco.....	6	Willard....	123.5	6	1	S.....	Cart.....	12	15
Reo.....	T & U Single	North East	Hand.	North East	6	North East	6	Willard....	108.5	6	2	GI.....	Wire....	6	5
Reo.....	T 6& U6 Single	North East	Hand.	North East	6	North East	6	Willard....	108.5	6	1	S.....	Wire....	6	6
Revere.....	Single	Bosch.....	Hand.	West.....	6	West.....	6	Willard....	120	6	1	S.....	GT.....	6	15
Roamer.....	6-54 Single	Bosch.....	Hand.	Bijur.....	6	Bijur.....	6	Columbia..	117	6	1	S.....	3A.....	6	10
R & V Knight.....	J & R Dual	Wagner....	Hand.	Wagner....	6	Wagner....	6	Willard....	117	6	1	S.....	Cart.....	250	20
Saxon.....	125 Single	Remy.....	Hand.	Wagner....	6	Wagner....	6	Prest-O-L..	80	6	1	S.....	Cart.....	6-8	15
Sayers.....	C.P. Single	Delco.....	Hand.	Delco.....	6	Delco.....	6	Willard....	80	6	1	GI.....	C.B.....	6	20
Scrapps-Booth.....	B Single	Remy.....	Hand.	Remy.....	6	Remy.....	6	Prest-O-L..	85	6	1	GI.....	GT.....	6	20
Seneca.....	H-2 Single	Conn.....	Hand.	Allis Chalm	6	Allis Chalm	6	Prest-O-L..	88	6	1	GM.....	G.....	6	20
Singer.....	20 Single	Bosch.....	Hand.	West.....	6	West.....	6	Willard....	115	6	1	S.....	G. C....	6	20
Skelton.....	35 Single	Conn.....	Hand.	West.....	6	West.....	6	Prest-O-L..	85	6	1	S.....	G. C....	6	20
Spacke.....	S-20 Double	Dixie.....	Hand.	West.....	6	West.....	6	Willard....	160	6	1	S.W....	2-A.....	6	15
Standard.....	8-1 Double	Dixie.....	Hand.	West.....	6	West.....	6	Willard....	100	6	1	G.....	Cart.....	6	20
Stanley.....	735 Single	At-Kent...	Hand.	West.....	12	West.....	12	Willard....	61.5	12	1	S.....	Cart.....	6	20
Stearns.....	SKL-4 Single	Conn.....	Hand.	A-L.....	6	A-L.....	6	U. S. L....	116	6	1	S.....	Cart.....	6	20
Stevens-Duryea.....	80 Single	Wagner....	Hand.	Wagner....	6-8	Wagner....	6	Willard....	115	6-8	1	S.....	Cart.....	6	10
Studebaker.....	All Double	Wagner....	Hand.	Remy.....	6	Remy.....	6	Willard....	115	12	1	S.....	Cart.....	6	10
Stutz.....	H Double	Wagner....	Hand.	Remy.....	6	Remy.....	6	Willard....	115	12	1	S.....	Cart.....	6	10
Templar.....	445 Single	Simms.....	Hand.	Bijur.....	6	Bijur.....	6	Columbia..	100	6	1	S.....	GT.....	6	20
Tulsa.....	E-1,2,3 Single	Delco.....	Hand.	Dyneto....	6	Dyneto....	6	Exide.....	90	6	1	S.....	GT.....	6	15
Velie.....	48 Single	At-Kent...	S. A....	Bijur.....	6	Bijur.....	6	Willard....	120	6	1	S.....	Wire....	6	15
Westcott.....	C-38&C-48 Single	Delco.....	H & A..	Delco.....	6	Delco.....	6	Willard....	120	6	1	S.....	CB.....	6	15
Willys-Knight.....	88-4 Single	Conn.....	Hand.	A-L.....	6-8	A-L.....	6	U. S. L....	120	6	2	GI.....	GT.....	6	15
Winton Six.....	24 Single	Bosch.....	Hand.	Bijur.....	6	Bijur.....	6	Willard....	120	6	1	S.....	GT.....	6	15
Winton Six.....	25 Single	Bosch.....	Hand.	Bijur.....	6	Bijur.....	6	Willard....	139	6	1	S.....	CB.....	6	15
Winther.....	61 Single	West.....	Hand.	West.....	6	West.....	6	Willard....	127	6	1	S.....	GI.....	6	10
Wolverine.....	Single	Bosch.....	Hand.	Bijur.....	6	Bijur.....	6	Prest-O-L..	120	6	1	S.....	CB.....	6	15

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H. & A., Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model	
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch			
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.						
20	Single...	6-8	20	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Schwarze	Maibohm.....B
	Single...	6-8	30	*6-8	9	6-8	2	6-8	2	A. C.	7/8	18	Sparton...	Marmon.....34
20	Double...	12-16	15	*12-16	4	12-16	2	12-16	2	Champion...	7/8	18	Schwarze	Maxwell.....25
	Single...	6-8	21	*6-8	12	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	McFarlan.....127
10	Single...	6-8	21	6-8	5	6-8	5	6-8	4	Champion...	7/8	18	Sparton...	Mercer.....Ser. 5
	Single...	6-8		6-8		6-8		6-8					Meteor.....	K R
	Single...	6-8	16	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Metz, Master Six....
10	Single...	6-8	15			s6-8	2	6-8	2	A. C.	7/8	18	Sparton...	Mitchell.....F-40
										Champion...	7/8	18	Klaxon...	Monitor.....
	Double...	6-8	16			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Monroe.....S-9
	Single...	6-8	20			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Moon.....6-48
		6-8	20			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Moon.....6-68
	Single...	6-8	20	6-8		6-8	2			Champion...	7/8	18	Garford...	Moore.....F
	Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan...	Nash.....
5		6-8	20	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton...	National... Series BB
5-30	Double...	12-16	15	12-16	4	12-16	2	12-16	2	Champion...	7/8	18	Schwarze	Nelson.....D
	Single...	6-8				6-8		d6-8					Noma.....	1-B
	Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Oakland.....34-B
10	Single...	6	32	6		6	4	6	4	Champion...	7/8	18	Klaxon...	Ogren.....6-60
	Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Oldsmobile....37-A
	Single...	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Oldsmobile....45-B
20	Single...	6-8	16			3-4	2	*3-4	2	Champion...	1/2		E. A. Lab.	Olympian.....45
										Champion...			A. L.	Overland.....4
10	Single...	6-8	33	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton...	Packard.....3-35
20	Single...	6-8	17	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan...	Paige.....All
	Single...	6-8	32			6-8	2	*3-4	4	Champion...	7/8	18	E. A. Lab.	Pan-American... All
	Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.			E. A. Lab.	Paterson.....6-47
30	Single...	6-8	15	6-8		6-8	2	6-8	4	A. C.			Sparton...	Peerless.....Ser. 6
	Single...	6-8	12			6	2	6	2	Champion...	7/8	18	Klaxon...	Piedmont.....4-30
	Single...	6-8	12			6	2	6	2	Champion...	7/8	18	Klaxon...	Piedmont.....6-40
	Single...	6-8	20			6-8	5	6-8	5	A. C.	7/8	18	Klaxon...	Pierce-Arrow...38&48
15	Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Pilot.....6-45
	Single...	12-16	20	12-16	4	12-16	4	12-16	2	Champion...		18	Stewart...	Porter.....46
	Double...	6-8	21	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	Premier.....6
5	Double...	6-8	15			3-4	2	*3-4	2	A. C.	7/8	18	Trojan...	Reo.....T & U
6	Single...	6-8	15			6	2	*3-4	2	A. C.	1/2		Klaxon...	Reo.....T6 & U6
15	Single...	6-8	20	*6-8	8	6-8	4	6-8	4	Rajah.....	7/8	18	Klaxon...	Revere.....
10	Single...	6-8	15	*6-8	2	6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Roamer.....6-54
20	Single...	6-8	15	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon...	R & V Knight. J. & R.
15	Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Trojan...	Saxon.....125
20	Single...	6-8	15			6-8	2	d6-8	2	Champion...	7/8	18	Stewart...	Sayers.....C. P.
20	Single...	6-8	18			6-8	2	6-8	2	A. C.	7/8	18	Opt.....	Scripps-Booth...B
5&10	Single...	6-8	15	6-8	2	6-8	2	d6-8	2	A. C.	7/8	18	Fitzgerald...	Seneca.....H-2
	Single...	6-8	15		4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	Singer.....20
		6	18			6	2	6	2	Bethlehem...	7/8	18	E. A. Lab.	Skelton.....35
15	Double...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Spacke.....S-20
20	Double...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Standard.....8-I
20	Single...	12-16	21	*12-16	4	12-16	2	12-16	2	A. C.	7/8	18	B. & A. Lab.	Stanley.....735
20	Single...	6-8	15	6-8	2	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Stearns.....SKL-4
10	Single...	6-8	12			6-8	2	6-8	2	Champion...	1/2		Trojan...	Stephens.....80
	Double...	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.			Stevens-Duryea...	Stevens-Duryea...
20	Single...	6-8	21	*6-8	4	6-8	2	6-8	2	Champion...	7/8		Studebaker...	Studebaker.....All
15	Single...	6-8	21	6-8	2	6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Stutz.....H
	Single...	6-8	15			6-8	4	d6-8	4	Champion...	7/8	18	Sparton...	Velie.....48
15	Single...	6-8	18	*6-8	4	3-4	2	d3-4	2	A. C.	7/8	18	Klaxon...	Westcott... C-38&C-48
15	4 S-D2...	6-8	21	6-8	4	3-4	2	*3-4	2	Champion...	7/8	18	Opt.....	Willys-Knight...88-4
15	Single...	6-8	17	6-8	7	6-8	2	6-8	2	Champion...	7/8	18	American...	Winton Six.....24
	Single...	6-8	17	6-8	7	6-8	2	6-8	2	Champion...	7/8	18	Electric...	Winton Six.....25
10	Single...	6	18			6	4	6	2	A. C.	7/8	18	Klaxon...	Winther.....61
15	Single...	6-8	32	6-8	7	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Wolverine.....

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with taillights; headlight contains sidelight; d,—double contact; s,—single contact.

From the Four Winds

Glimpses at the World of Motordom

Coming Motor Events

AUTOMOBILE SHOWS

Albany, N. Y.	Automobile Show	Feb. 14 to 21
Brooklyn, N. Y.	Motor Vehicle Dealers' Ass'n	Feb. 14 to 21
Detroit, Mich.	Detroit Automobile Dealers' Ass'n	Feb. 14 to 21
San Antonio, Tex.	Automobile Show	Feb. 14 to 22
Des Moines, Ia.	Des Moines Automobile Dealers' Ass'n	Feb. 16 to 21
Des Moines, Ia.	Herring Motor Co.	Feb. 16 to 21
Hazleton, Pa.	Hazleton Automobile Trade Ass'n	Feb. 16 to 21
Manchester, N. H.	Automobile Show, Academy	Feb. 16 to 20
St. Louis	St. Louis Automobile Mfrs. & Dealers' Ass'n	Feb. 16 to 21
New Haven, Conn.	Automobile Show	Feb. 16 to 21
Waterloo, Iowa	First Annual Show	Feb. 21 to 26
San Francisco	San Francisco Motor Car Dealers' Ass'n	Feb. 21 to 28
Ottawa, Canada	Motor Show	Feb. 21 to 28
Bethlehem, Pa.	Sixth Annual Show	Feb. 23 to 28
Louisville, Ky.	Louisville Automobile Dealers' Ass'n	Feb. 23 to 28
Pittsfield, Mass.	Mass. State Armory	Feb. 23 to 28
Portland, Ore.	Portland Automobile Trade Ass'n	Feb. 23 to 28
Grand Rapids, Mich.	Automobile Show	Feb. 23 to 28
Wichita, Kans.	Automobile Show	Feb. 23 to 28
Columbus, Ohio	Memorial Hall	Feb. 24 to 28
Fort Dodge, Ia.	Automobile Dealers' Ass'n	Feb. 24 to 28
Newark, N. J.	First Regiment Armory	Feb. 28 to March 6
St. Joseph, Mo.	St. Joseph Automobile Dealer's Ass'n	March 1 to 6
Omaha, Nebr.	Automobile Show	March 1 to 6
Scranton, Pa.	Automobile Show	March 1 to 6
Buffalo, N. Y.	Buffalo Automobile Dealers' Ass'n	March 1 to 6
Portland, Maine	Portland Automobile Dealers' Ass'n	March 1 to 6
Perth Amboy, N. J.	First Automobile Show	March 1 to 6
Lyons	Automobile Show	March 1 to 6
Springfield, Mass.	Springfield Automotive Dealers' Ass'n	March 1 to 7
Tulsa, Okla.	Automobile Show	March 1 to 6
Syracuse, N. Y.	Syracuse Automobile Dealers' Ass'n	March 1 to 6
Seattle, Wash.	Seattle Automobile Show	March 1 to 6
Denver	Denver Automobile Trade Ass'n	March 2 to 6
Clinton, Iowa	Clinton Automobile Dealers' Ass'n	March 3 to 6
Quincy, Ill.	Quincy Automobile Dealers' Ass'n	March
Lancaster, Pa.	Automobile Show	March 3 to 6
Gloversville, N. Y.	Automobile Show	March 8 to 13
Indianapolis, Ind.	Automobile Show	March 8 to 13
Jersey City, N. J.	Automobile Show	March
Boston, Mass.	Mechanics' Bldg.	March 13 to 20
New Orleans	Automobile Show	March
Little Rock, Ark.	Liberty Hall	March 2 to 6
La Salle, Ill.	Illinois Valley Automobile Dealers' Ass'n	March 12 to 14
Great Falls, Mont.	Automobile Show	March 15 to 20
Wilkes-Barre, Pa.	Passenger Car & Truck Show	March 15 to 22
Duluth, Minn.	Automobile Show	March 22 to 27
Oklahoma City, Okla.	Oklahoma City Dealers' Ass'n	March 22 to 27
Torrington, Conn.	Automobile Show	March 22 to 27
Goldsboro, N. C.	Goldsboro Automotive Trade Ass'n	March 31 to Apr. 3
Albany, Ala.	Automobile Show	April 6 to 10

TRUCK SHOWS

New Haven, Conn.	Automobile Dealers' Ass'n	Feb. 16 to 21
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TRACTOR SHOWS

Kansas City, Mo.	Kansas City Tractor Club	Feb. 16 to 21
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MISCELLANEOUS CONVENTIONS AND MEETINGS

Lake Charles, La.	Louisiana-Mississippi Automotive Trade Ass'n Convention	March 17 to 18
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RACES

Beverly Hills, Los Angeles	Washington's Birthday Race	Feb. 21
Beverly Hills, Los Angeles	Track Race	March 17
Indianapolis Speedway	500-Mile Race	May 31
Tacoma, Washington	Speedway Race	July 5

TOURS

New York-San Francisco	Glidden Tour	September
Lake Huron Tour		July

Automobile Club Plans Garage—Plans for the erection of a large garage by the members of the Automobile Club of Hartford are maturing. The new venture is to be known as the Hartford Automobile Club Garage Co. The corporation has a capital of \$800,000, which is equally divided between common and preferred stock. Subscriptions are being sought only for the preferred stock. The corporation is to keep the securities until the conclusion of the financing when they will be turned over to the underwriters. There are now over a thousand members in the Automobile Club of Hartford and the success of the venture seems assured. Practically all of the Hartford garages are crowded in the busy season and there is room for another, properly conducted.

Iowa Improving Roads—Iowa will spend \$30,000,000 for good roads in 1920 according to a statement made this week by Fred. R. White, of Ames, chief engineer of the state highway commission. According to Mr. White this amount of money will be apportioned upon the following work: 355.85 miles of road paving, 231 miles of road graveling, 1334 miles of earth roads graded and drained and additional work on 2000 miles of primary roads calling for federal aid. Paving contracts let thus far call for concrete and brick.

New Law Causes Manufacturers Extra Work—A new requirement of the Wisconsin motor code which has just gone into effect and is causing much extra work for manufacturers as well as dealers is Section 1636-48 of the statutes, an enactment of the 1919 session of the Legislature, reading:

It is hereby made the duty of every manufacturer of or dealer in motor vehicles in this state to make a monthly report to the secretary of state on blanks to be prescribed and furnished by the secretary of state, showing information as follows:

The date of the sale of each motor vehicle sold, date of delivery of same, the name and address of the party to whom sold, maker's name of motor vehicle, motor number, style of vehicle, motive power, horsepower, new or second-hand motor vehicle.

Southern California Believes in Signs—Southern California now contains 66,133 enameled metal auto-guide signs, scattered over an area of 70,399 square miles, according to the annual report of the Automobile Club of southern California for last year. There were 8,929 new signs placed in the southern part of the state in 1919.

Of the total number of guide signs erected by the automobile Club, 6,219 are in the desert of eastern California and Arizona. These show the location of water holes that are fit for drinking purposes. Special attention has been given to the desert sign posting since transcontinental touring has become so general. The Los Angeles Chamber of Commerce was instrumental in obtaining government aid in this work.

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Dupel MOTOR AGE

Volume XXXVII
Number 9

PUBLISHED WEEKLY AT THE MAILERS BUILDING
CHICAGO, FEBRUARY 26, 1920

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With an Essex franchise your growth is certain. Because you sell a car that people want. You don't have to beat down the objections of prospects.

Most of the people you approach are already convinced of the Essex worth and desirability.

Think what that means when Essex, as an unknown car, set a world-selling record in its first year with more than \$35,000,000 paid for 22,000 cars.

That was before it had proved itself. Now that it has set the world endurance mark of 3,037 miles in 50 hours and the 24-hour road mark of 1,061 miles, it is more wanted than ever.

The Prosperity of Essex dealers everywhere reflects how the public appreciates the qualities Essex offers.

Of course you know that Hudson built the Essex. And the public now knows this fact which was at first withheld. So in addition to its own clear-cut merits, Essex has behind it the vast prestige of Hudson and all that it has done.



Essex dealers enjoy a great advantage as part of this big organization. They are supported by powerful national and local advertising. All of these are big factors in successful selling.

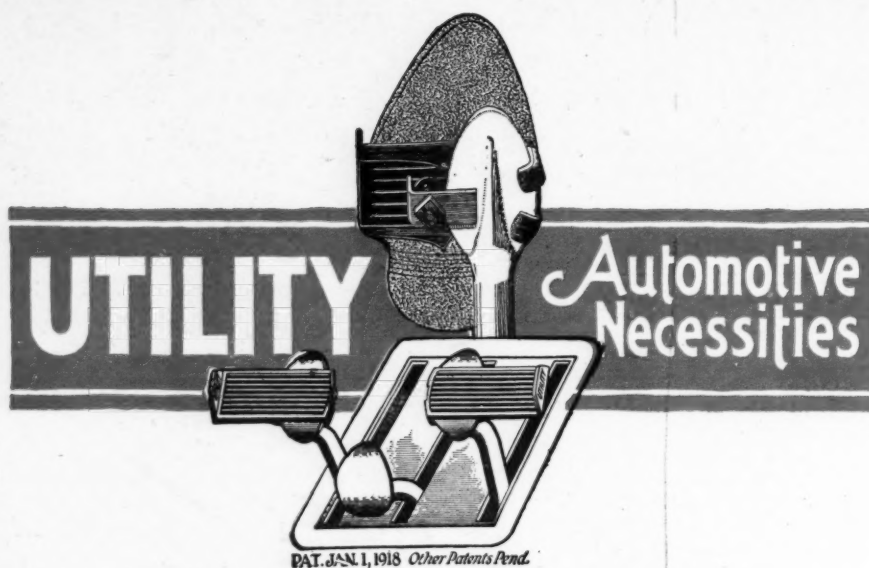
And Essex dealers have the strongest of all selling and advertising aids—the good will and admiration of thousands who know how it has shown its quality. It has excited more comment and discussion than any car ever brought out.

Hear how people compare the qualities of Essex with the outstanding fine qualities of large, costly cars.

Essex dealers are booked way ahead with orders. Buyers are assured for every car we can produce for months.

But we wish to expand our territory to enable more intensive selling later. You may get an Essex franchise if you measure up to the standard of Essex dealers. It is one upon which you can build a strong, secure future.

(E-3)



UTILITY Pedals *for* Fords

THE season for overhauling is close at hand—the time of the year when owners **want** to make **real** improvements in their cars.

Your recommendation of UTILITY Pedals to any Ford owner almost invariably results in a sale—one that gains your customer's good will for valuable service rendered, and pays you liberal profits as well.

Ford owners call UTILITY Pedals "the absolutely necessary accessory for Fords."

Experience proves that they sell.

Dealers—Order from your jobbers.

Jobbers—Get in touch with us.

Price per set, \$1.25

HILL PUMP VALVE COMPANY

Mfrs. of UTILITY Protected Heaters, UTILITY Pedals for Fords, UTILITY Pumps, UTILITY Universal Rim Wrenches and UTILITY Universal Wrenches

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CHICAGO, ILLINOIS

Sales Department

THE ZINKE CO., 1323 S. Michigan Ave., Chicago